JANUARY 1955

FOUNDRY

...WHEREVER METALS ARE CAST

- **OUTLOOK IMPROVES FOR 1955**
  Industry Leaders Optimistic
- **FRONT SLAGGING CUPOLAS**
  A Review of Their Operation
- **SHELL MOLDING IS EASIER**
  Some Recent Developments
- **WHAT DOES A CASTING COST?**
  How To Figure Selling Prices

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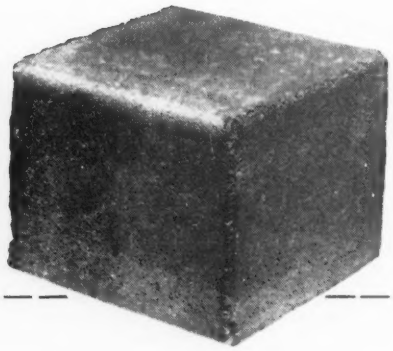
REDUCE MISRUNS by as much as 50%



Iron deoxidized with FERROCARBO® patented Briquettes is *more fluid* at casting temperatures than untreated iron. It flows more readily into thin sections or complicated molds. You get better castings...fewer misruns. Leading foundries report up to 50% reduction in misruns after using FERROCARBO in the charge.

Deoxidizing with FERROCARBO gives you additional advantages, too: Silicon recovery increases materially. You can charge more scrap—either steel or cast iron—since FERROCARBO reduces the chilling tendency.

The man who uses your castings benefits, too. The castings you supply him are finer-grained, denser, stronger...much easier to machine because they contain fewer segregations and chilled or hard spots.

FOR ALL THE FACTS, call your FERROCARBO Distributor today. Or write for the free booklet, "Producing Superior Gray Iron Castings." Address: The Carborundum Company, Dept. F 84-41, Niagara Falls, N.Y.

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"...It sets the pace in the industry"

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Mr. Charles W. Vokac
Manager, Hydro-Arc Furnace Dept.
Whiting Corporation
Harvey, Illinois

Dear Mr. Vokac:

The Whiting Hydro-Arc Furnace which you furnished us recently is operating very satisfactorily. Anyone in the market for an electric furnace should certainly look into the merits of the Whiting Hydro-Arc before purchasing a furnace. In my opinion, it sets the pace in the industry; the Whiting Hydro-Arc is really an up-to-date furnace.

Sincerely yours,

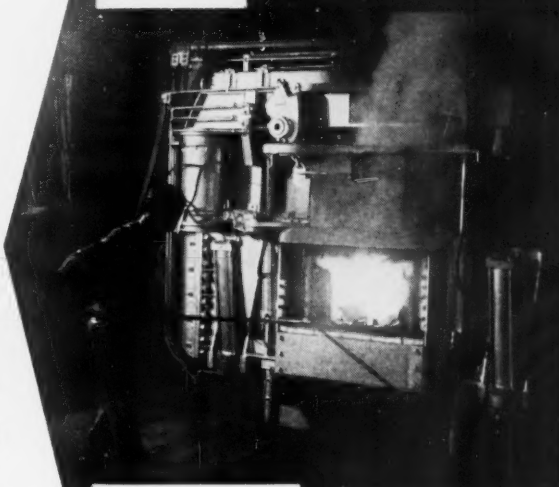
FLORIDA MACHINE & FOUNDRY CO.

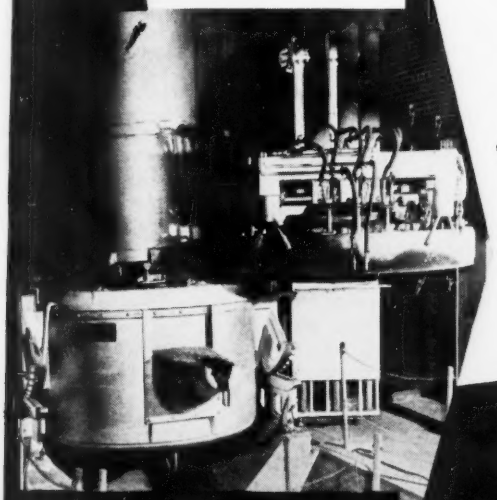
Thomas W. Peacock

Thomas W. Peacock
Assistant Superintendent

TWP/wb

ELECTRIC STEEL CASTINGS





WHITING

Write today:

WHITING CORPORATION

HYDRO-ARC ELECTRIC FURNACE

EASY SAND CONTROL

You take Federal's CROWN HILL Seacoal, GREEN BOND Bentonite and Federal SAND STABILIZER and you've got yourself three sand additives that will really simplify your sand control and provide uniform, thoroughly satisfactory results.

These three materials, added in varying amounts to your sand, dry or in slurry form, will give you close control over carbon content, green and dry strength, and will also provide GREATER FLOWABILITY, with LESS LUMPY SHAKEOUT.

CROWN HILL Seacoal is exceptionally low in sulphur content—which means your castings will have more easily-machined surfaces. GREEN BOND Bentonite is unexcelled in its ability to develop and control green and dry strength. It lasts and lasts—retaining its bonding efficiency much longer than any other clay. Its medium to low viscosity characteristics enable you to cut down on mulling time—permits slurry users to add more bentonite per gallon of slurry, for just the strength desired, without strain on the pumping system. Federal SAND STABILIZER improves resistance to expansion defects and increases flowability—thus increasing uniformity of mold hardness. It sharply reduces viscosity of slurry, without decreasing bond strength per gallon of slurry. And it provides better, LESS LUMPY SHAKEOUT without adding other clays to sand mixtures.

Yes, these Federal additives really simplify your sand control and give you excellent results. But, that's not all! *Their cost will not exceed $1.00 per ton of castings produced!* To learn more about these efficient additives, write for your copy of our bulletin on "Tailor-Made Molding Sands".

IMPORTANT

FOR SLURRY USERS!

The addition of Federal SAND STABILIZER to your slurry will definitely reduce its viscosity and increase its green strength. This enables you to add a greater percentage of Granulated GREEN BOND Bentonite* to your slurry—producing a more highly concentrated strength per gallon of slurry (lower water content)—with *less strain* on the pumping system and *no clogging* of pipe lines.

*Federal GREEN BOND Bentonite is available in three convenient forms:

(1) PULVERIZED—for general foundry use as a dry additive, for core or molding sand.

(2) GB-100 FINE GRANULAR—a dry additive with low dust content, for core or molding sand.

(3) NO. 1200 SLURRY GRADE GRANULAR—for use as a wet additive.

All three grades have medium to low viscosity properties.

If you have "lumpy shakeout" — use Federal SAND STABILIZER!

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FOUNDRY

January 1955

Volume 83—Number 1

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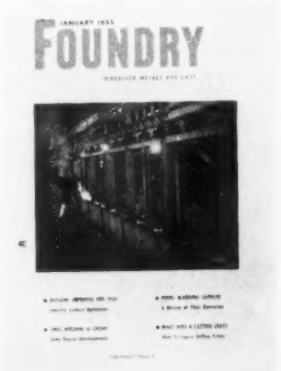

THE COVER: Pouring off shell mold castings at Walworth Co., Boston. This view, published originally in the *Bakelite Review*, is presented through the courtesy of the Bakelite Co.

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Making an important contribution to both quality and cost reduction is Archer LIN-O-CEL, a foundry sand stabilizer unexcelled in flowability and finish characteristics. LIN-O-CEL is a finely ground cellulose material which "cushions" sand expansion and eliminates stresses at the mold surface. Casting defects are thus held to a minimum.

The chart at the right is evidence of the savings which can be gained through the use of LIN-O-CEL.

We urge *you* to be skeptical. First read about LIN-O-CEL; then test a sample in your foundry. Write ADM, or use coupon at the right.

NOTE: The castings pictured are produced by the Foundry Department of the General Electric Company at the Elmira Foundries, Elmira, N. Y.

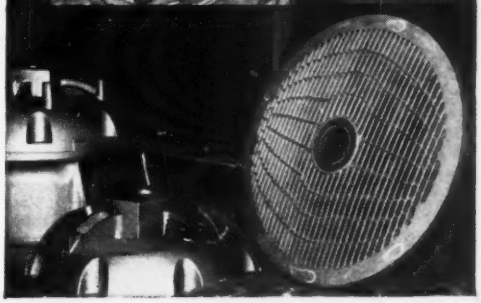
rcher • aniels • idland compan
FOUNDRY PRODUCTS DIVISION • 2191 West 110th Street • Cleveland 2, Oh
SWITCH TO THE ADM LINE OF QUALITY FOUNDRY PRODUCTS
LIN-O-CEL | LINOIL | INDUCTOL | FREFLO | ADMIREZ

Archer LIN-O-CEL is carefully measured by weight, then mixed into system sand.

SMALL CASTINGS, such as these fence post caps, are furnished to outside customers by General Electric. Some castings are small as 8 oz.

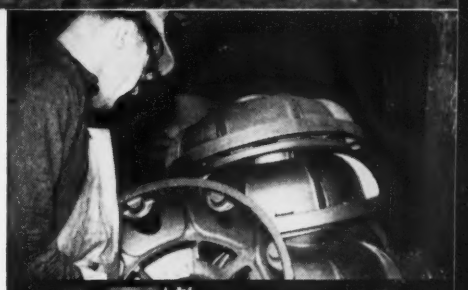
LARGE CASTINGS, like this huge frame generally require less cleaning when LIN-O-CEL is used.

INTRICATE CASTINGS, for instance this grille made with LIN-O-CEL-treated sand, clean quicker and look better.



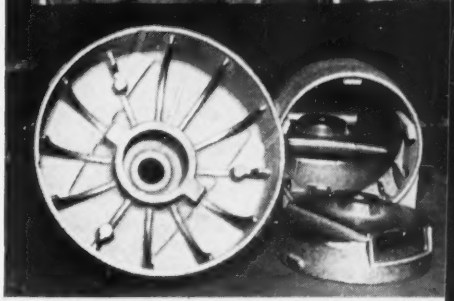
SMOOTH FINISH CASTINGS

Unretouched photographs reveal the unblemished surfaces of these bell and frame castings.

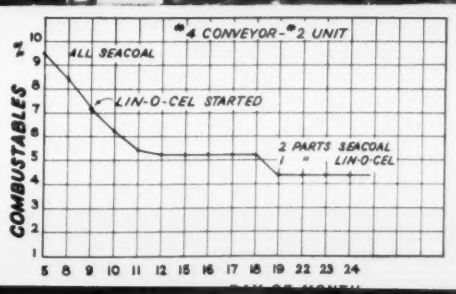


Huge end-bells require minimum chipping in the cleaning operation.

Spot checking the clean, smooth, finish of a heavy casting before cleaning.



SAVING IN SAND COST is revealed by this chart showing reduction in combustibles in system sand through the use of LIN-O-CEL.



SEND FOR BULLETIN NO. 8170 TODAY!

Archer-Daniels-Midland Company
Foundry Products Division
2191 West 110th Street, Cleveland 2, Ohio

☐ Please send me copy of LIN-O-CEL Bulletin.
☐ Please have ADM Representative call.

Name .....
Title .....
Company .....
Address .....
City ..... Zone .....
State .....

ALUMINIZED Protective Clothing

AO 1481 RA
SPRING TYPE LEGGING

Many prefer it because no adjustments are needed. Easy on, easy off. Spring steel frame protects leg from impact. Air space for insulation between leg and legging. Chrome-tanned leather flare with spring clip.

AO 5 x 357 GLOVE

Gunn style, 13½″ long. Horsesplit leather palm and fingers. Seam at base of fingers, double stitches, flat seam for extra comfort. One-piece aluminized asbestos back. Wing thumb. Full lining.

AO 204 RA-44 COAT

Provides complete aluminized protection for upper body. Wool collar protects neck. Snap fastener adjustment on cuffs for snug fit. All snap fasteners on front have leather-pull tabs for quick removal. All seams double stitched. Coat lengths 30″, 36″, 40″, 44″, 48″, 50″.

"It has paid for itself already" says a large user of **ALUMINIZED CLOTHING**

After a few months' use, a prominent steel company is completely sold on Aluminized Protective Clothing which REFLECTS 90% OF RADIANT HEAT, WEIGHS HALF AS MUCH AS CONVENTIONAL ASBESTOS, AND HAS SUPERIOR ABRASION-RESISTANCE (won't peel or crack)!

AO† Aluminized Asbestos Clothing is highly recommended for cupola and ladle pouring in foundries, open hearth, blast furnace and electric furnace tapping and other exposures to high radiant heat. AO Aluminized Duck is advised for less severe exposures. Check with your AO Safety Products Representative on leggings, spats, mittens, gloves, coats, jackets, sleeves, pants, overalls, coveralls, aprons, and hoods.

†T.M. Reg. by American Optical Company

American Optical
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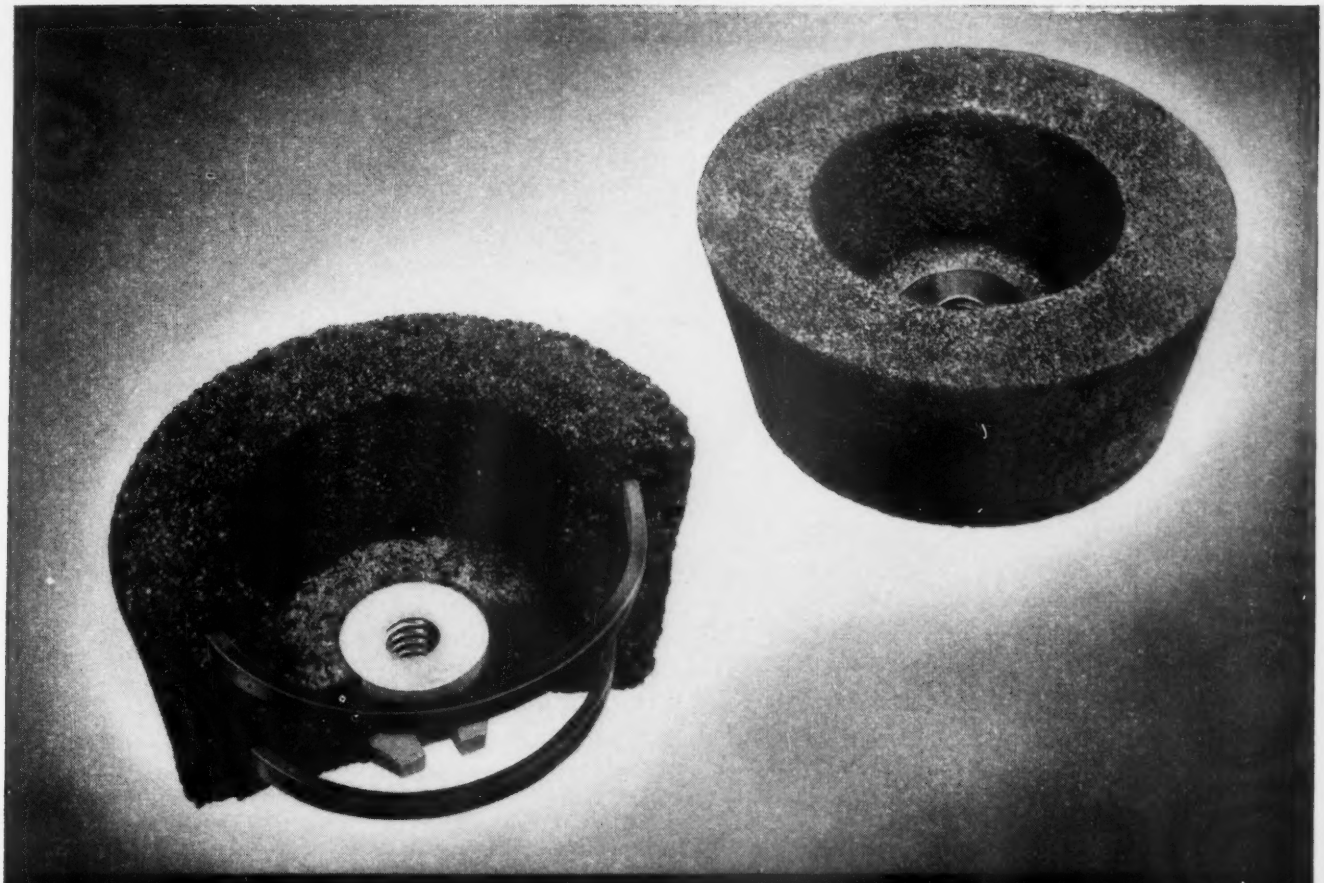

NOW! a new safety concept in grinding wheels—

FOR PORTABLE GRINDERS

COLONIAL WHEELS . . . Equipped with GRINDAWAY* Safety Rings . . . PROVIDE AN INCREASED SAFETY FACTOR!

Increased safety in grinding wheels is now available! Colonial reinforced resinoid wheels for high speed, portable grinding are equipped with the revolutionary GRINDAWAY safety rings to provide greater safety at no sacrifice in grinding quality!

Made of a material having greater tensile strength than steel, Colonial GRINDAWAY safety rings can be inserted in the wheels where reinforcement is most needed . . . *in the actual grinding portion of the wheel.* This is possible since they abrade away as the wheel wears through them. Such reinforcement in the actual grinding portion of the wheel has never before been possible.

Colonial Abrasive Products Company offers GRINDAWAY safety rings in three types: straight, recessed, and flaring cups with grinding quality maintained in each and without premium cost.

New literature is available describing the construction, advantages, and prices of each type Colonial GRINDAWAY wheel. We invite you to write for your copy today.

**PATENT APPLIED FOR*

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SIXTH AND HARRY STREETS
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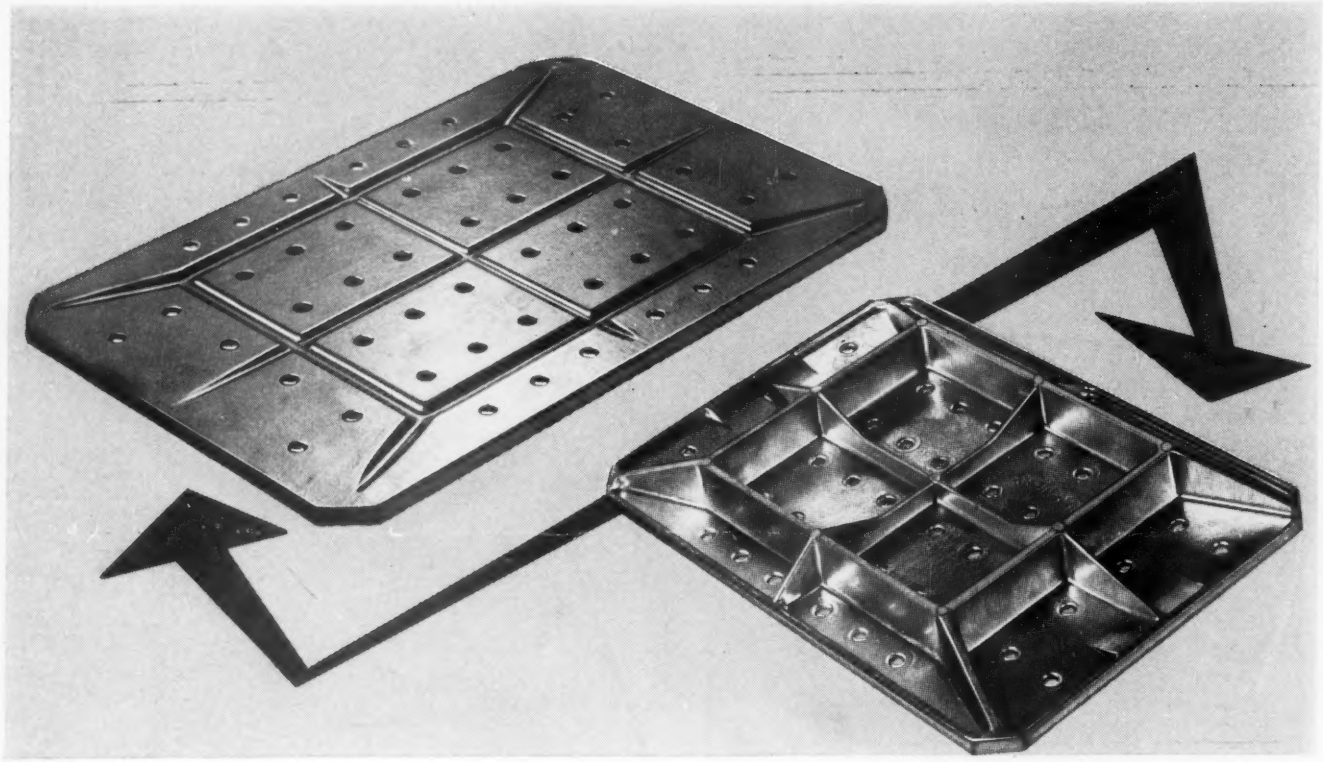


Bottom Board Standardization — and how EDCO "helped"

For years, foundries stocked many sizes of boards. Inventories, even in a small foundry, ran into hundreds of boards. They were wood, metal, steel, iron, sometimes aluminum. The point being they were different—in size, and in construction.

Edco, in conjunction with various foundries across the country, surveyed to determine the most popular size of Bottom Boards in productive use. That was 8 years ago when Edco had 6 board sizes. Today, the standard Edco list includes 83 sizes. Impressive? Yes. But without standardization, the number would be 2, possibly 3 times as great.

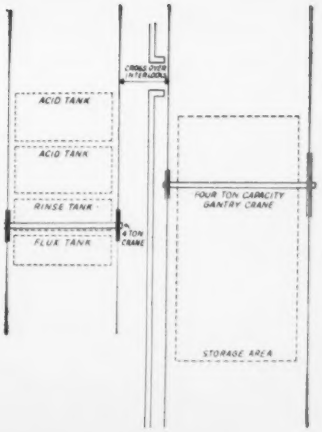
Standardization—by Edco and by foundrymen, has resulted in economics throughout the industry by eliminating unnecessary sizes, by meeting the specific needs of all sizes of foundries, regardless of the type of casting done.

Next time you need safe, permanent Bottom Board equipment, consider Edco Dowmetal Bottom Boards—simply write us or phone MAnsfield 6-7330 and we'll send you a price schedule and list of 83 standard sizes available from stock.

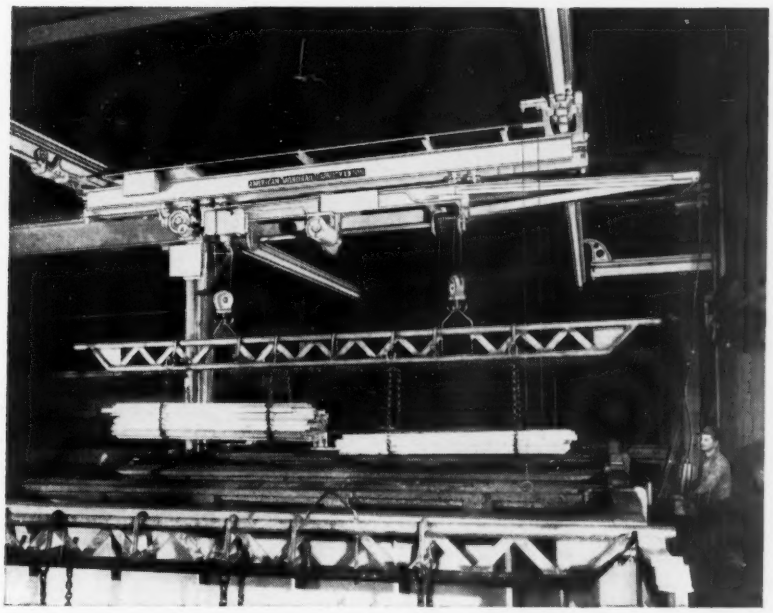
CHRISTIANSEN CORPORATION

210 SOUTH MARION STREET • OAK PARK 1 (Chicago Suburb), ILLINOIS

EDCO DOWMETAL BOTTOM BOARDS • EDCO ALUMINUM INGOT



AMERICAN MONORAIL GANTRY CRANE SYSTEM *speeds galvanizing!*



Steel fence posts travel from fabrication to galvanizing over a gantry bridge which interlocks at a crossover track through doorway for passage to the MonoRail crane serving the tanks in the plating room.

All travel on the 4-ton system is motor operated and controlled by push-button station in the operator's hand.

Here is truly team-work handling that results in cost savings as well as increased tonnage through the galvanizing process. It is a typical example of American MonoRail engineering available at no obligation for the solution of your handling problems.

Send for Bulletin C-1 illustrating hundreds of successful Mono-Rail installations.

AMERICAN OVERHEAD HANDLING EQUIPMENT

AMERICAN MONORAIL COMPANY

13104 ATHENS AVENUE • CLEVELAND 7, OHIO

You expect more from
IMPERIAL
...and you get more

Here's Why!

Service records up to 10 years in foundry and similarly punishing installations are not unusual for Imperial conveying and elevating belts.

What is unusual is the way Imperial gives its belts such long-wearing, money-saving qualities. Highest-quality hard silver duck, double-stitched with inner-locking stitches to positively prevent ply separation, gives them inherent strength.

Exclusive compounds used

To this basic construction Imperial adds something else . . . special, exclusive chemical formulations developed by Imperial and constantly improved during our 45-year experience.

Imperial Belts are impregnated with these compounds to prevent or minimize damage from cutting, gouging, crushing impact, abrasion, moisture, oil and temperatures as high as 600° F. This process also further strengthens, lubricates and preserves the fibers so that Imperial Belts outlast others as much as *four to one.*

Job-designed belting

Different compounds are used to create a dozen belts of widely varying physical characteristics. Thus, Imperial Belts are job-designed for specific operating conditions . . . they last longer, require less maintenance.

The formulae of these compounds are Imperial's secret. But it's no secret that Imperial Belts give lowest ultimate belting cost and top operating satisfaction. Why not request our free engineering assistance on your new or replacement installations?

Imperial
BELTING CO.
1755 S. Kilbourn Ave., Chicago 23, Ill.

WITH THE EDITORS

SECRECY IS DANGEROUS: The journalistic profession has been greatly concerned in recent years over the growing tendency toward secrecy in government. Believing that in the struggle for that inherent American freedom, the right to know about our government at the time of decision and not after the fact, when too often it is too late, Sigma Delta Chi, the professional journalistic fraternity, has been dealing with many cases of the abridgement of the people's right to know about their government.

A report of the Advancement of Freedom of Information Committee, presented at the annual convention of that fraternity in Columbus, O., last November, carried one paragraph that described the present tendency to secrecy.

"There appears to have developed in American government during the last twenty-five years a new philosophy that, once elected or appointed, the politician assumes that the people's business is his private domain and that the people are entitled only to that which he deems fit to dole out."

Industry is encountering a situation of this nature in the Business and Defense Services Administration. Committees made up of men from industry are being appointed to consider particular problems connected with the industry and defense. After the names are selected, the proposed members must be cleared for security. Normally the names then are announced, but recently there appears to be a reluctance to release this information. Those in charge seem to prefer to have the committee meet and report before the names are announced. This, of course, prevents the industry from questioning the make-up of the committee or from offering suggestions for consideration in the committee deliberations.

Surely industry is entitled to a part in discussions that may have a pronounced effect on the future welfare of each company.

I feel the names should be announced immediately after clearance.

—o—

The Artistic Can Be Difficult: In its Sunday rotogravure section a large metropolitan newspaper recently featured photographs taken in a foundry. The full-page, four-color cover illustration of the tapping of an electric furnace was spectacular. The brief story that accompanied nearly four pages of photographs pointed to the fact that foundry products are among the most important and valuable produced by the industry of that city, and then continued:

"They are basic throughout the industrial setup and vital in the production of defense. The work of foundrymen, themselves, is just about the hardest physical labor available, performed in hot and dirty surroundings, accompanied by the necessity of keeping constantly alert to avoid danger."

The article concluded by saying that the pictures shown were shot through a haze of dust and smoke by a staff photographer.

I am sorry that a hankering for the spectacular on the part of the photographer evidently resulted in the collection and publishing of these photographs. And I would like to emphasize the importance of having someone near top management accompany any photographer or reporter collecting photographs or news stories at your plant. Generally newspapers do not submit material before publication.

—o—

Moving Forward: The editors appreciate greatly the kind co-operation of leaders in ten important societies and associations of the foundry industry in making possible the interesting survey of opinion on the future potential of the foundry industry. Presented under the heading, "You Can Sell More Castings in 1955!" on pages 68 to 75 inclusive, these comments show definitely that these men, as individuals rather than in their official capacities in the organizations, have great faith that castings will grow in demand in the years ahead. With organized groups having such real leadership and drive, the industry cannot help but move forward.

—o—

Why Do We Do It: While the exportation of ferrous scrap continues to mount under Department of Commerce blessing, the Russians seem to have different ideas. A recent Associated Press dispatch carried the following interesting information:

Red Youth Ordered
To Start Scrap Drive

Moscow, Dec. 1 (AP)—The Soviet Union has ordered young Communists to scour the countryside for scrap iron to feed blast furnaces.

Sundays and other days off are suggested as good times to work on this scrap drive.

Could it be that this news report provides overtones that are not being

(Concluded on p. 12)

Crucible Melting

10 SURE GAINS with CRUCIBLE MELTING

Get these 10 for your foundry

1. LOWER INVESTMENT
2. GREATER FLEXIBILITY
3. IMPROVED METAL QUALITY
4. LOWER METAL LOSSES
5. LOWER FUEL COSTS
6. LOWER DEPRECIATION CHARGES
7. MORE METAL PER HOUR
8. ADAPTABILITY
9. LOWER OVER-ALL MELTING COSTS
10. AND NOW YOU CAN GET LONGER CRUCIBLE LIFE THAN EVER BEFORE

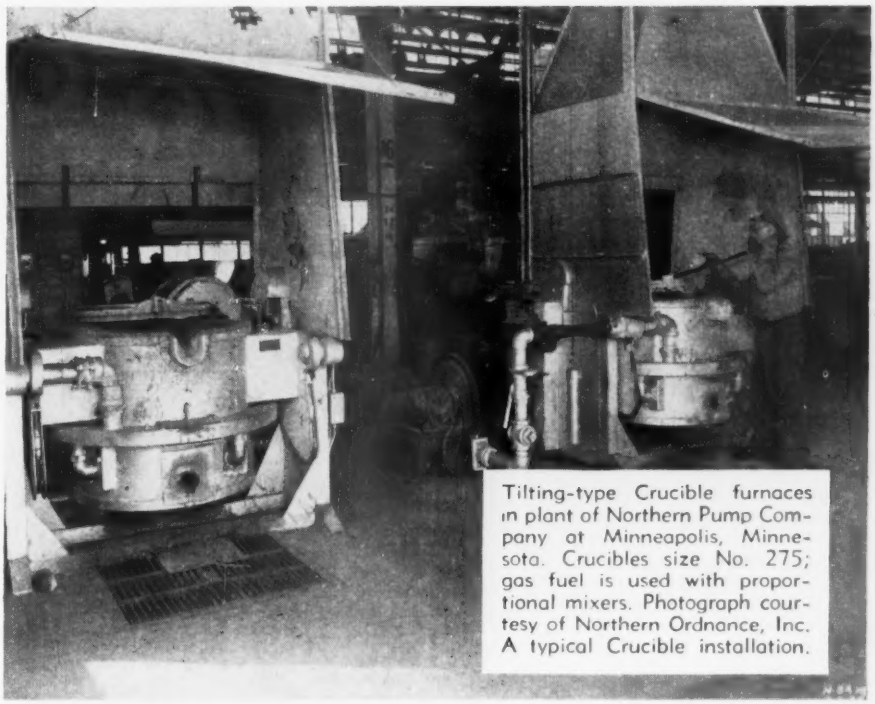
CRUCIBLES FOR ADAPTABILITY

Crucible
MANUFACTURERS ASSOCIATION
27 WILLIAM STREET
NEW YORK 5, N. Y.

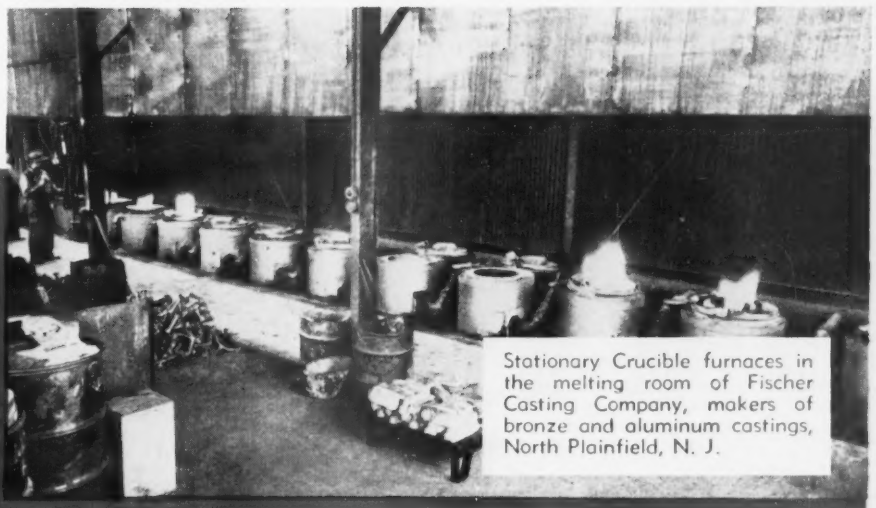
*Each gain proved in actual experience; each enough in itself to make it pay you to use Crucible Melting.

For example, take No. 8—Adaptability. Crucible Melting best meets variations in size and analyses of melts required and expansion or contraction in production.

Have you seen the new "'CRUCIBLE CHARLIE' says . . ." leaflets issued by Crucible Manufacturers Association? If not, ask your superintendent about this. He has a copy.



Tilting-type Crucible furnaces in plant of Northern Pump Company at Minneapolis, Minnesota. Crucibles size No. 275; gas fuel is used with proportional mixers. Photograph courtesy of Northern Ordnance, Inc. A typical Crucible installation.



Stationary Crucible furnaces in the melting room of Fischer Casting Company, makers of bronze and aluminum castings, North Plainfield, N. J.

THESE FIRMS CAN TAKE CARE OF ALL YOUR REQUIREMENTS FOR CRUCIBLE MELTING

ELECTRO REFRACTORIES & ABRASIVES CORP.
ROSS-TACONY CRUCIBLE CO.
VESUVIUS CRUCIBLE CO.
JOSEPH DIXON CRUCIBLE CO.
LAVA CRUCIBLE-REFRACTORIES CO.
AMERICAN REFRACTORIES & CRUCIBLE CORP.

HAUSFELD FURNACES

FOR "ALL-OUT" PRODUCTION IN NON-FERROUS FOUNDRIES

Provide the Utmost in Speed Production and Safety

FURNACES FOR
BRASS • ALUMINUM • MAGNESIUM
AND ALL OTHER
NON-FERROUS ALLOYS

The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO

(*Concluded from page* 10)

recognized by the bureaucrats at Washington?

—o—

Do It Yourself: The do-it-yourself craze (and I am too lazy to indulge in the fad) has now invaded the field of castings. The Kansas City Specialties Co., P.O. Box 6022, Kansas City, Mo., is advertising a bronze foundry for schools and home work shops, which permits one to "make your own castings of aluminum, copper, bronze and silver." It seems the foundry sets are available in three sizes, and include a 2400° F furnace. So, if you hanker for a bit of molding in the evening or over the week ends, why go to the shop? Now you can let Mom know all about the trials and tribulations encountered in the production of castings.

—o—

Wages in China: A recent dispatch from Hong Kong, prepared by Derwyck Winterton, correspondent for the *London Daily Herald,* who accompanied the Attlee party to Red China, contains the following paragraph:

"A floor sweeper in a foundry—not classified as a 'productive worker'—draws $14 a month. It is likely that millions who work in tiny handicraft shops get less, and the standard of most peasants is probably lower still."

—o—

AFS Moves: Members of the American Foundrymen's Society are to be congratulated on the new National Headquarters Building dedicated in November. The building, located near the outskirts of Des Plaines, Ill., is beautiful, and the layout has been designed to provide compactness and efficiency for the staff of the society. As expressed many times at the dedication ceremonies, it is most regrettable that Walton L. Woody did not live to see his dream of a new society headquarters building come true.

—o—

Molding Sand Symposium: A number of readers have commented most favorably on the "Molding Sand Symposium" which was presented as a complete package in the November issue. Because many have indicated that they would appreciate having this information in a permanent form, the business department has ordered reprints of the entire series. The reprints cover 38 pages and may be purchased for 50 cents per copy. Address FOUNDRY, Book Department, Penton Building, Cleveland 13, Ohio.

—o—

Happy New Year: All of the editors join me in wishing you a Very Happy New Year, with much in the way of Peace, Health and Prosperity. F.G.S.

B&W ALLMUL *with electrically fused grain for . . .*

Stamina in Tough Service

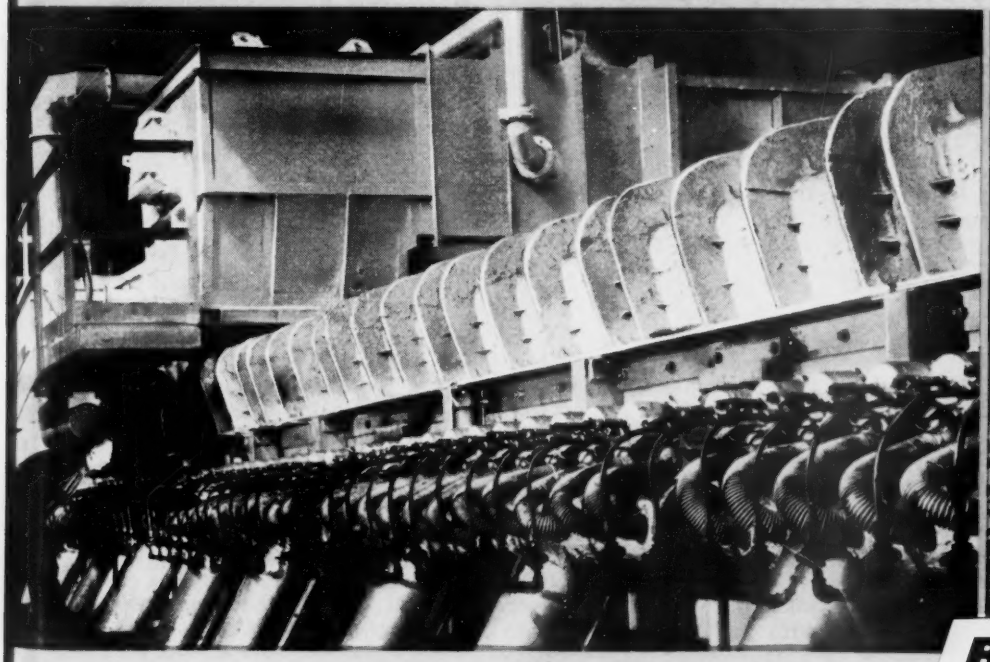
B&W Allmuls are used in many different kinds of heavy-duty furnaces. This example happens to be a butt weld furnace for continuous high speed welding of pipe. In the hottest areas (3000F or more), a mullite-*type* brick lasted only six weeks. Cause of failure: spalling, aggravated by metal penetration.

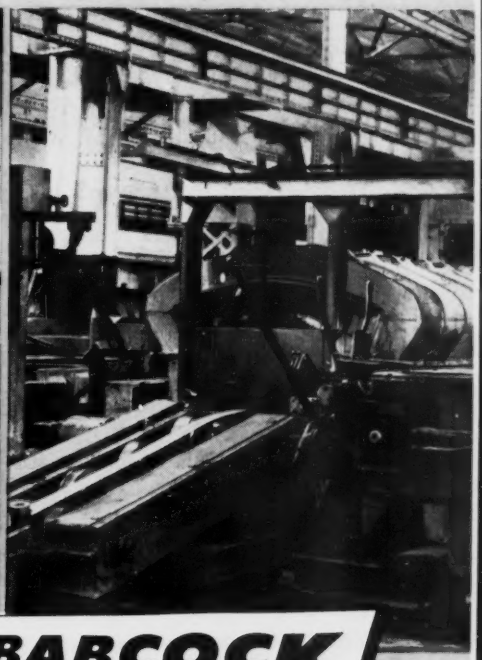
At the same locations, B&W Allmuls, made of electrically melted grain, lasted a full year—or more than eight times as long. It's by no means strange that the furnace operator now uses Allmuls for bungs, burner blocks, uptake arches and sidewalls, crossovers and furnace sidewalls.

Allmuls are volume produced by a highly efficient process. That's how you get—at relatively low first cost—top quality, fused-mullite brick with these properties: high hot load strength, high resistance to spalling, good volume stability, and a melting point of 3335F.

Whatever you're processing—steel or other metals, ceramics or chemicals—if your furnace demands a lining that can really take punishment, it will pay you to get complete facts on B&W Allmul. May we send you additional information?

A Close-up view of butt weld furnace where electrically-fused B&W Allmul far outlasted mullite-type brick. B Another view of butt weld furnace — charging end.





B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick
B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars
OTHER B&W PRODUCTS: Stationary & Marine Boilers and Component Equipment
Chemical Recovery Units • Seamless & Welded Tubes • Pulverizers • Fuel Burning Equipment
Pressure Vessels • Alloy Castings

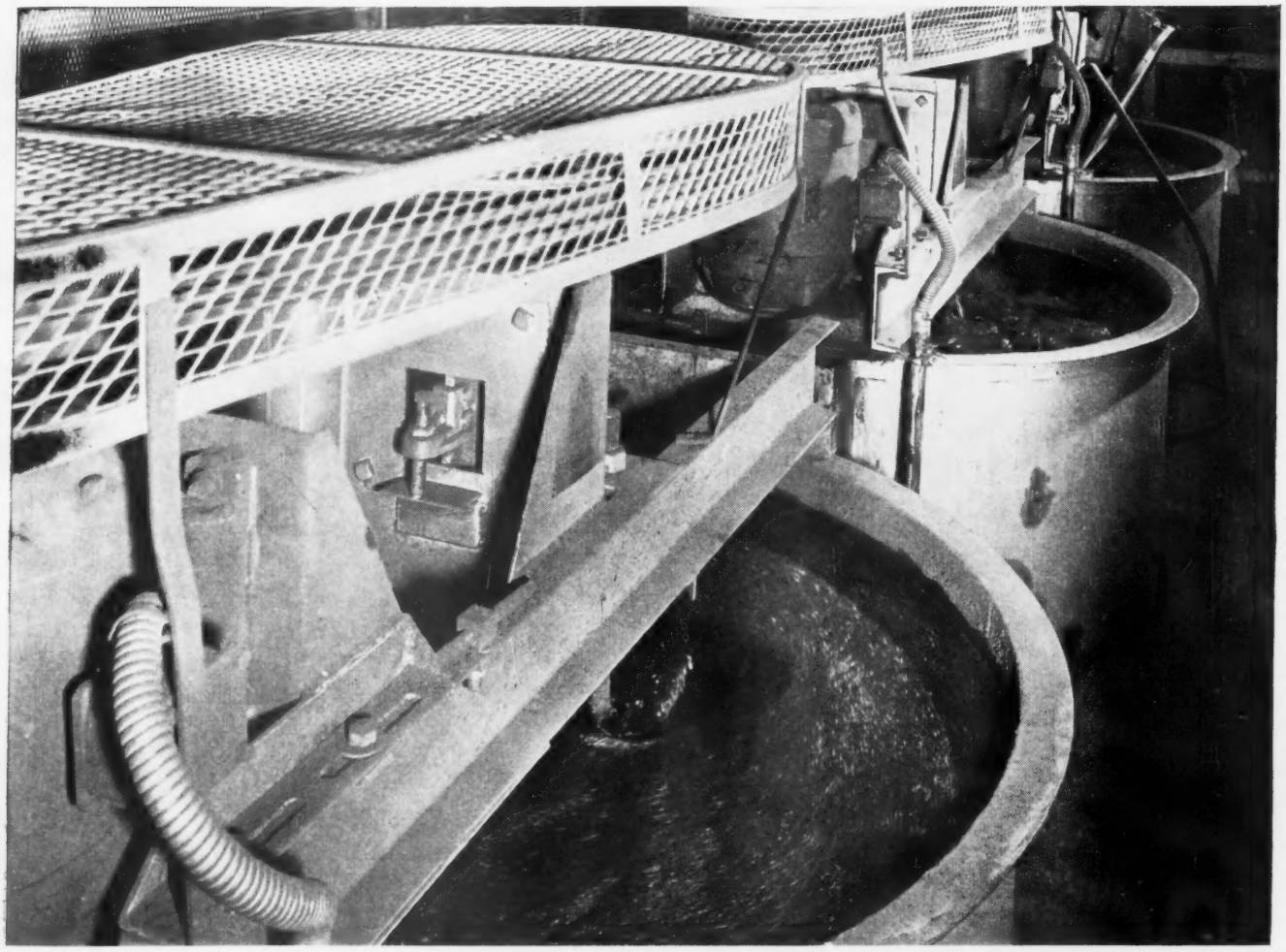
BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42ND ST. NEW YORK 17 N.Y.
WORKS: AUGUSTA, GA.

B&W

RB30

Foundry Sand Reclamation



One of the big factors of high production, low costs and simplicity of operation is the patented Denver Heavy Duty Sand Scrubber pictured, above, in Denver Sand Reclamation System. Bonding material on the surface of sand grains are removed by attrition of grains striking one another inside the scrubbers at high velocity in a water and sand mix.

Foundry Sand Costs Are Cut, Sand Disposal Problems Are Solved With Denver Sand Reclamation System

Denver Sand Reclamation offers foundries another means of cutting costs and increasing profits. One Denver Sand Reclamation System, at a foundry producing 400-tons of castings per month, saved the foundry $42,864.00 a year — that's $42,864.00 in added profits.

New Sand Use Cut 50%: During the first year, 1120 lbs. of new sand per ton of castings was used, compared with 2400 lbs. of new sand per ton of castings before Denver Sand Reclamation. Cost of the 1280 lbs. of reclaimed sand used per ton of castings, on this basis, is $1.20. Goal is to cut new sand use to 600 lbs.

Reclaimed Sand Makes Better Castings: The Denver Reclamation Systems are so effective that many molders prefer characteristics of reclaimed sand over characteristics of new sand. This is because the reclaimed sand is more stable. In addition to the dollar saving features of Denver Reclamation Systems, several foundries have installed systems to solve their problem of disposing used sand—80% to 90% recovery of sand is realized.

No Charge Sand Test: We would like to demonstrate what the Denver Sand Reclamation Process will do on your discarded sand. A 100 lb. sample is sufficient. There will be no charge or obligation for a preliminary sand test. We will return the cleaned sand for your inspection and analysis.

In order that we might have as much information as possible for this preliminary test, we would appreciate your writing us first, so we can supply you a questionnaire of data necessary to make the test. Remember, there will be no charge or obligation.

Find out how you can cut your foundry sand costs —solve used sand disposal problems! Write for the Sand Reclamation Test Questionnaire, today!

DECO FLOTATION ENGINEERS — 24 HOUR SERVICE — DENVER EQUIPMENT COMPANY

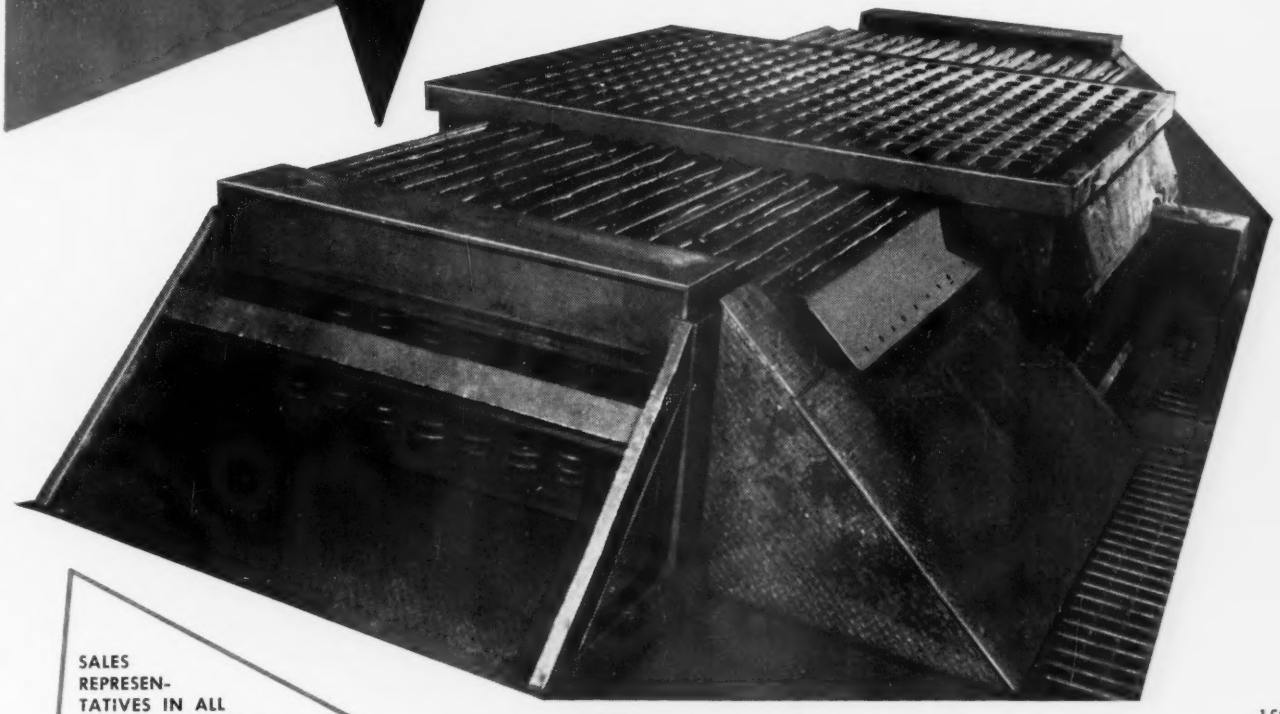
DENVER EQUIPMENT COMPANY

1400 SEVENTEENTH ST. DENVER, COLORADO

DENVER, NEW YORK, CHICAGO, EL PASO, SALT LAKE CITY, VANCOUVER, TORONTO, MEXICO, D.F., LONDON, JOHANNESBURG

Simplicity spring mounted shake-outs handle big flasks with ease at Beloit Foundry Company in Wisconsin

Installed at the Beloit Foundry Company, Beloit, Wisconsin, this Simplicity Shake-Out arrangement can handle big flasks ranging up to 75 tons regardless of the length or shape of the castings being shaken out. The center of the installation is a Simplicity 10′ x 12′ spring mounted shake-out which is one of the biggest single units in operation today. Prior to the installation of this shake-out, a Simplicity 8′ x 10′ Dual was used. By splitting the Dual and installing the new model between them, Beloit Foundry was able to get 200 sq. feet of useable shake-out surface. A combination of Positive Vertical Action with controlled throw, rugged body construction, and a massive 6′ Ductile Iron (nodular iron) deck which was cast by the Beloit Foundry Company, makes shake-out speedy and thorough without the danger of castings feeding off or bouncing off the deck. For handling heavy concentrated loads ranging up to 200 tons maximum, the Simplicity Spring Mounted Shake-Out is unequaled. If you're pouring really big castings it will pay you to call in your Simplicity sales engineer and let him give you all the facts on Simplicity Shake-Outs and other foundry equipment.



SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A. FOR CANADA: Simplicity Engineering, Ltd. FOR EXPORT: Brown and Sites, 50 Church Street, N. Y. 7, N. Y.

152

Simplicity

TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND, MICHIGAN

SAVE MONEY

with

Cincinnati

Snagging

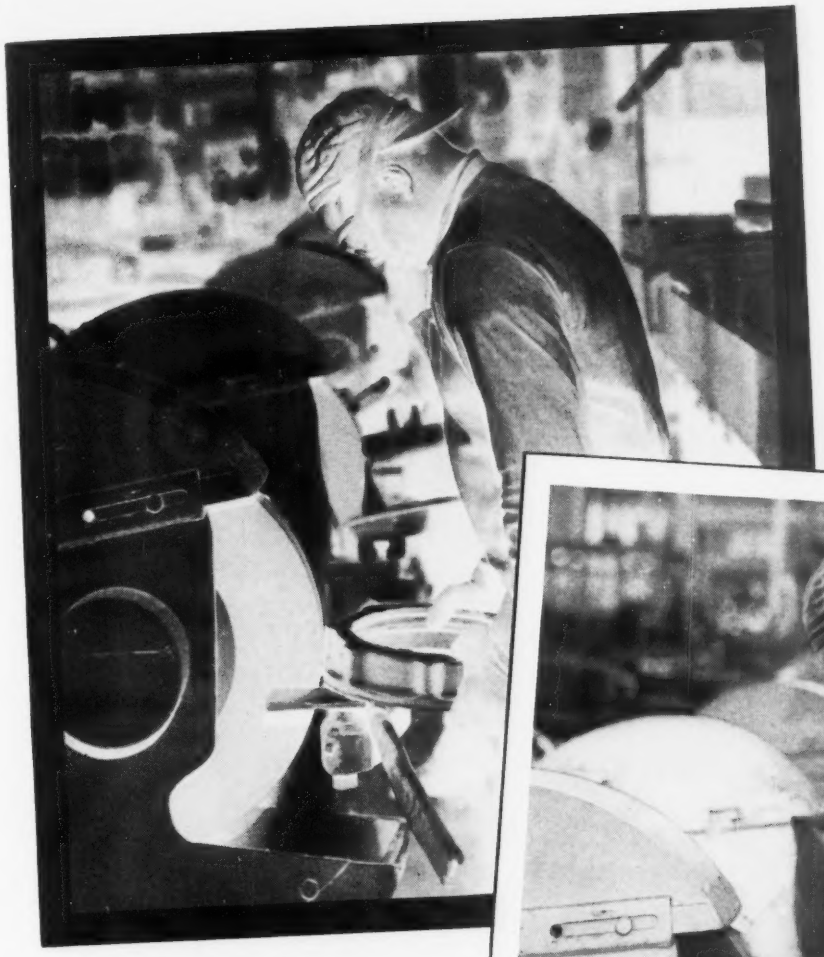
Wheels

From coast to coast, foundries report that CINCINNATI (PD) WHEELS do a better snagging job – not only on stand grinders, but on swing frame and portable grinders, too. CINCINNATI (PD) WHEELS increase production and give outstanding economy through freer cutting, self-dressing action . . . *and Positive Duplication.*

Just as a negative guarantees exact duplication of a photograph, the CINCINNATI (PD) *Manufacturing Process assures* a Positive Duplication of the original wheel every time you *reorder. Yet these better, cost-cutting* CINCINNATI (PD) WHEELS *are priced no higher than ordinary wheels.*

Positive Duplication (PD) is the result of extensive manufacturing research and the development of new standards of manufacture with 36 quality control steps. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike – providing the *same long wheel life, the same reduced operator fatigue and the same self-dressing action.*

CINCINNATI (PD) WHEELS are made in vitrified and resinoid bonds for ferrous and non-ferrous foundries. They are available in a complete variety of popular sizes and shapes. We'll be happy to tell you about our complete line of straight wheels, cups, cones and plugs, and to prove to you how CINCINNATI (PD) WHEELS will make money for you. Just contact us and we'll send one of our representatives. Wire, write or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

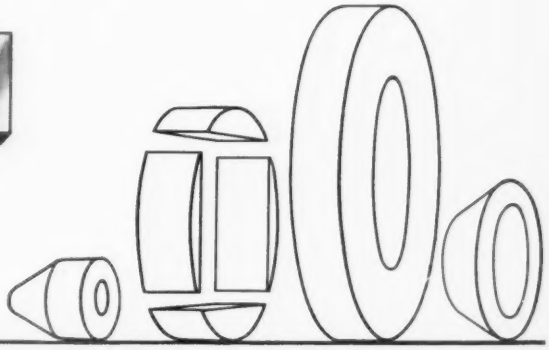


Just as a NEGATIVE guarantees you an exact duplication of a photograph each and every time, you are always assured a . . .

. . . POSITIVE DUPLICATION of an original grinding wheel each and every time through the CINCINNATI (PD) Manufacturing Process.

CINCINNATI
Grinding Wheels

THE CINCINNATI MILLING MACHINE CO.
Cincinnati 9, Ohio



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SITUATION UNDER CONTROL BY KEOKUK

CHIEF KEOKUK:
"Me no need teach Little Chief—him say modern generation learn make teepee on TV!"

PRINCESS WENATCHEE:
"As usual he has the situation well under control!"

KEOKUK **K** ELECTRO-METALS COMPANY
KEOKUK, IOWA
WENATCHEE DIVISION, WENATCHEE, WASHINGTON

Keokuk Silvery . . . the *superior* form of silicon introduction for steel plants and foundries . . . available in 60 and 30 lb. pigs and 12½ lb. piglets . . . in regular or alloy analysis. Keokuk also manufactures high silicon metal.

The way for *you* to keep the cost and quality situation under control is to use Keokuk Silvery Pig Iron! Due to it being a less concentrated form of silicon, it assures *less* silicon waste. Car for car, pig for pig, its uniformity *never* varies. Charge it by magnet or count.

SALES AGENT: MILLER AND COMPANY

332 S. Michigan Ave., Chicago 4, Illinois
3504 Carew Tower, Cincinnati 2, Ohio
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Juniata

TRADE MARK REGISTERED

The UNIVERSAL FOUNDRY SAND

For Cores: JUNIATA Bank Sand excels in these qualities: broad grain distribution which defies sagging and distortion during baking; low oil absorption with minimum gas when casting and perfect collapsibility.

For Molds: JUNIATA Bank Sand provides that grain pattern which is so essential to the control of excessive mold surface expansion. Metal penetration, scabbing, wash and other associated casting defects are effectively prevented.

For Shell Molding: JUNIATA Bank Sand has proven its superior adaptability to this method of precision casting. Its higher retained dry strength and ductility make it the perfect sand for shells.

MOLDING SANDS
CORE SANDS
SILICA SANDS
SHELL SANDS
BLAST SANDS
BENTONITES
BONDING CLAYS
WOOD FLOUR
FIRE CLAYS
REFRACTORIES
SHOT AND GRIT
MALLEABRASIVE
ABC COKE

GREAT LAKES FOUNDRY SAND CO.

UNITED ARTISTS BUILDING, DETROIT, MICHIGAN

THE FUNCTION OF THE KNIGHT ORGANIZATION IS TO PROVIDE COMPREHENSIVE PROFESSIONAL ENGINEERING SERVICES—

Foundry Engineering
•
Architectural Engineering
•
Construction Management
•
Organization
•
Management
•
Industrial Engineering
•
Wage Incentives
•
Cost Control
•
Standard Costs
•
Flexible Budgeting
•
Production Control
•
Modernization
•
Mechanization
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Methods
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Materials Handling
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Automation
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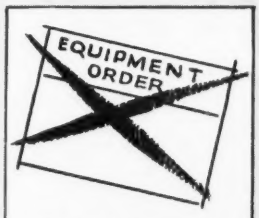
Survey of Facilities

KNIGHT ENGINEERS assist you in analyzing your operations, establishing and carrying out a program to increase unit or total production at lower costs.



The Knight organization is not interested in the sale of any equipment.

EVIDENCE OF EXPERIENCE

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Only COLEMAN TOWER® OVENS
provide all these major advantages

INCREASE PRODUCTIVITY

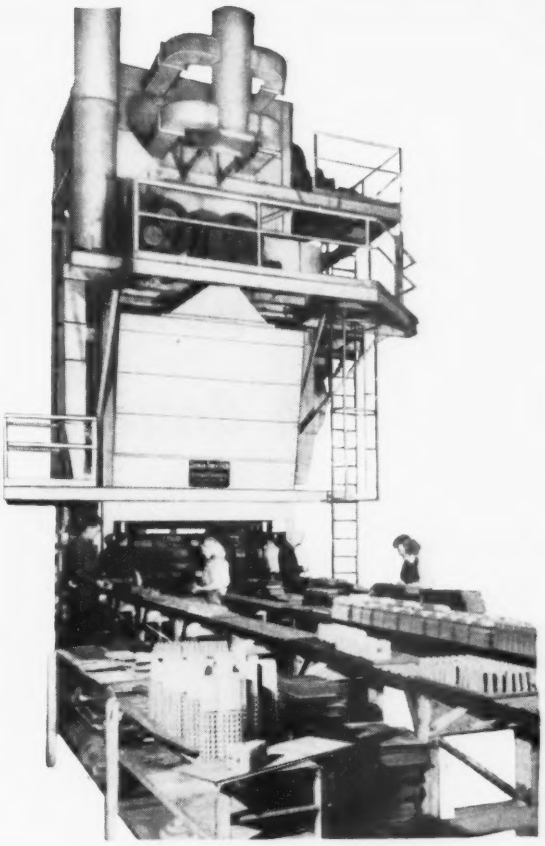
Savings through consistent, dependable production of perfectly baked cores; eliminating rejects, makeovers and casting losses due to improper core baking.

SAVE SPACE

Vertical design permits saving of approximately 75% of floor space over batch ovens of the same capacity. Cores are "smoked-off" and cooled before leaving unloading station.

REDUCE MAINTENANCE

Heavy duty construction for continuous, dependable performance and economical operation reduces maintenance cost to a minimum.



Coleman Tower ovens use only 25% of floor space required by batch type ovens of same capacity.

SAVE TIME

Cores of widely different sizes and shapes can be handled at the same time, all baked with consistent uniformity. Trucks, racks and money-wasting handling methods are eliminated.

SAVE BINDER

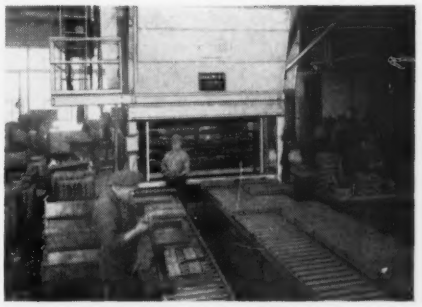
Proper core baking atmosphere and uniform temperature provide sizeable savings in conventional or high speed binders.

SAVE FUEL

The recovered heat is used over again, thus yielding important fuel saving. The most economical fuel available to you can be conveniently used.

Patented Open Center permits close, efficient grouping of coremakers around the oven... results in increased coremaker productivity.

3-way loading feature increases accessibility 300% over ordinary vertical oven designs.



Recuperative cooling system "smokes-off" and cools the cores before they reach unload station.

Coleman Tower Ovens are the most widely used continuous core baking ovens in the foundry industry. They have brought the advantages of mechanization to large and small foundries and have made important cost reductions. Why not find out whether Coleman Tower Ovens can bring the same savings to you? Our engineers are available without obligation to make practical recommendations for your particular requirements...call or write today!

WRITE FOR BULLETIN 54

A COMPLETE RANGE OF TYPES AND SIZES

for every core baking and mold drying requirement:

Tower Ovens • Horizontal Conveyor Ovens
Car-Type Core Ovens • Car-Type Mold Ovens
Transrack Ovens • Rolling Drawer Ovens
Portable Core Ovens • Portable Mold Dryers
Dielectric Core Ovens

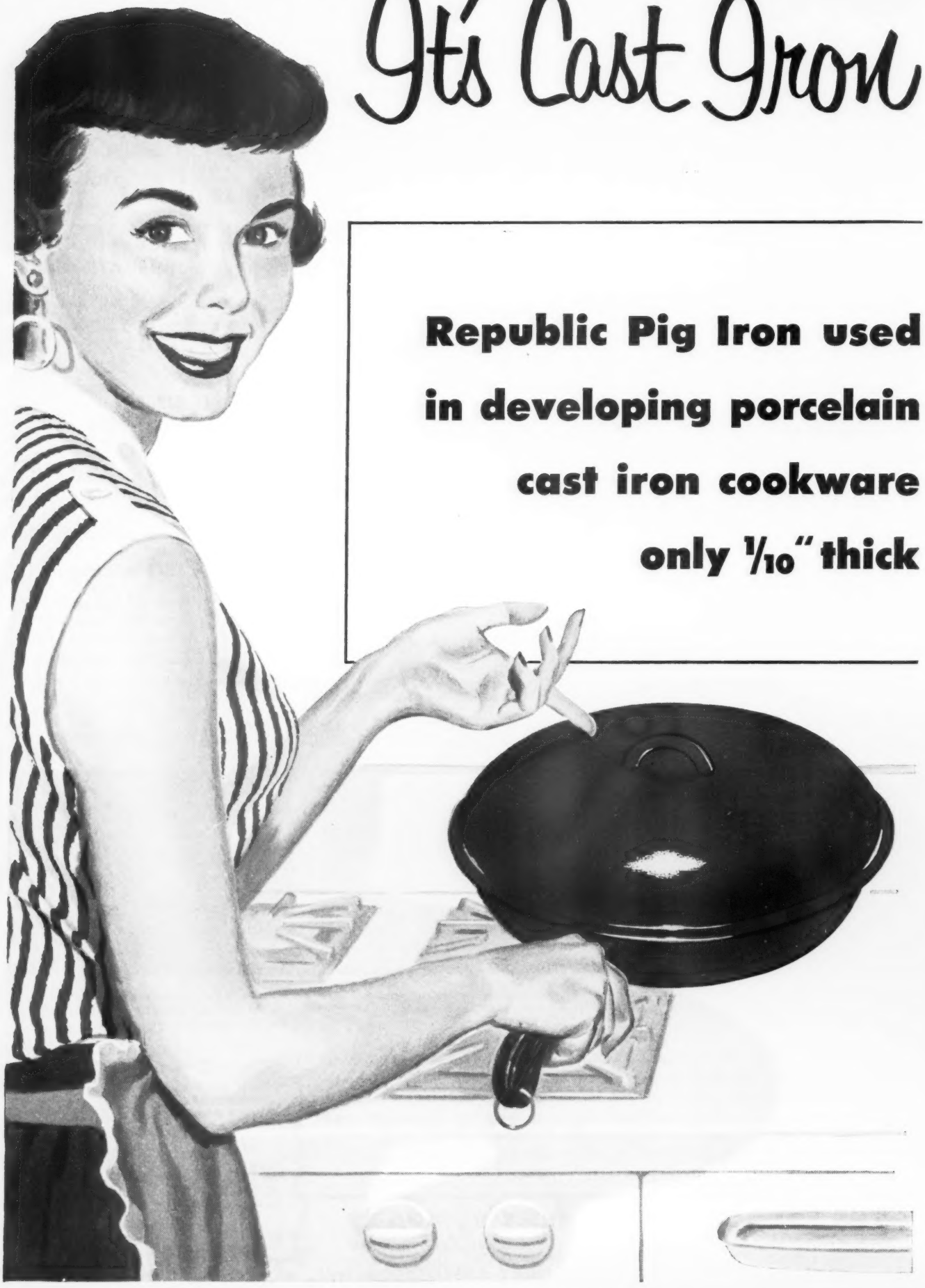
THE FOUNDRY EQUIPMENT COMPANY

1821 COLUMBUS ROAD **CLEVELAND 13, OHIO**

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS

It's Cast Iron

Republic Pig Iron used in developing porcelain cast iron cookware only 1/10" thick



with a FEATHERWEIGHT feel!

The finished castings for this new product have a uniform, tight grain with a good enameling surface. In fact, the manufacturer, Prizer-Painter Stove Works, Inc., of Reading, Pa., is able to apply enamel directly to the cast surface, eliminating the need for a base coat. Prizer-Ware is strong and durable. Yet, it is only one-tenth of an inch thick.

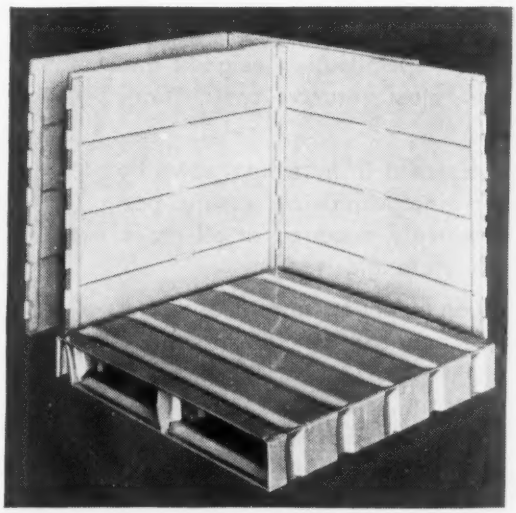
Casting requirements called for an extremely fluid, clean pig iron with no porosity. A Republic pig iron metallurgist was called in to work with Prizer personnel. He recommended the proper grade of pig iron without hesitation or prejudice—because Republic is the only producer of all grades of merchant pig iron.

Close cooperation between customer and the Republic pig iron metallurgist is not unusual. Why not make it a practice to call him in whenever you need help? There is no cost or obligation.

You can handle heavy castings easily with Republic Chain Slings. Fabricated from Republic Alloy Steels, their high strength—low weight ratio—provides an exceptionally high degree of safety. Republic Chain Slings are made in any length to meet your requirements. All are proof tested and warranted to meet or exceed specifications.

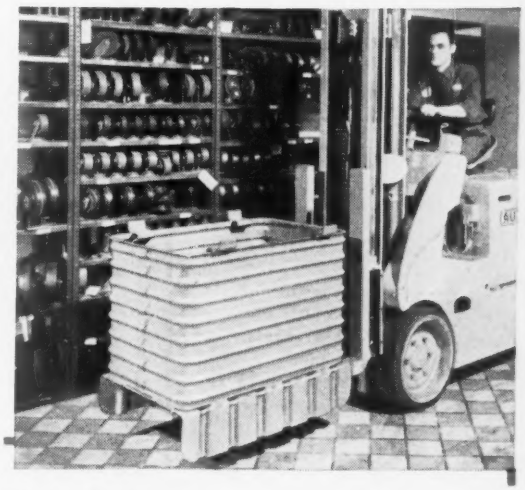
REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products



Collaps-a-tainer, the steel box that folds flat, can reduce your cost of interplant shipping. Have your traffic manager figure your cost of returning empty containers. Then compare with savings possible from using the Collaps-a-tainer. Four collapsed units ship in the space of one open unit. It's easy to assemble, lightweight, strong and durable and easy to knock down. Collaps-a-tainer can also be used on the production line or as a storage bin. It stacks to any practical height. Standard size, 30″ x 30″ x 30″, weighs approximately 100 pounds.

To help improve foundry efficiency and economy during molding, moving, storing and shipping operations, Republic makes a complete line of steel boxes, skids, pallets and flasks. They are built to your specific requirements. Republic Pallet Racks and Steel Shelving provide additional space-saving economy—help simplify your handling problems.



REPUBLIC STEEL CORPORATION
3132 East 45th Street • Cleveland 27, Ohio

Please send me literature on:

☐ Chain Slings ☐ Boxes, Skids, Pallets ☐ Collaps-A-Tainer
☐ Pallet Racks, Shelving ☐ Have a Pig Iron Metallurgist Call.

Name_____ Title_____

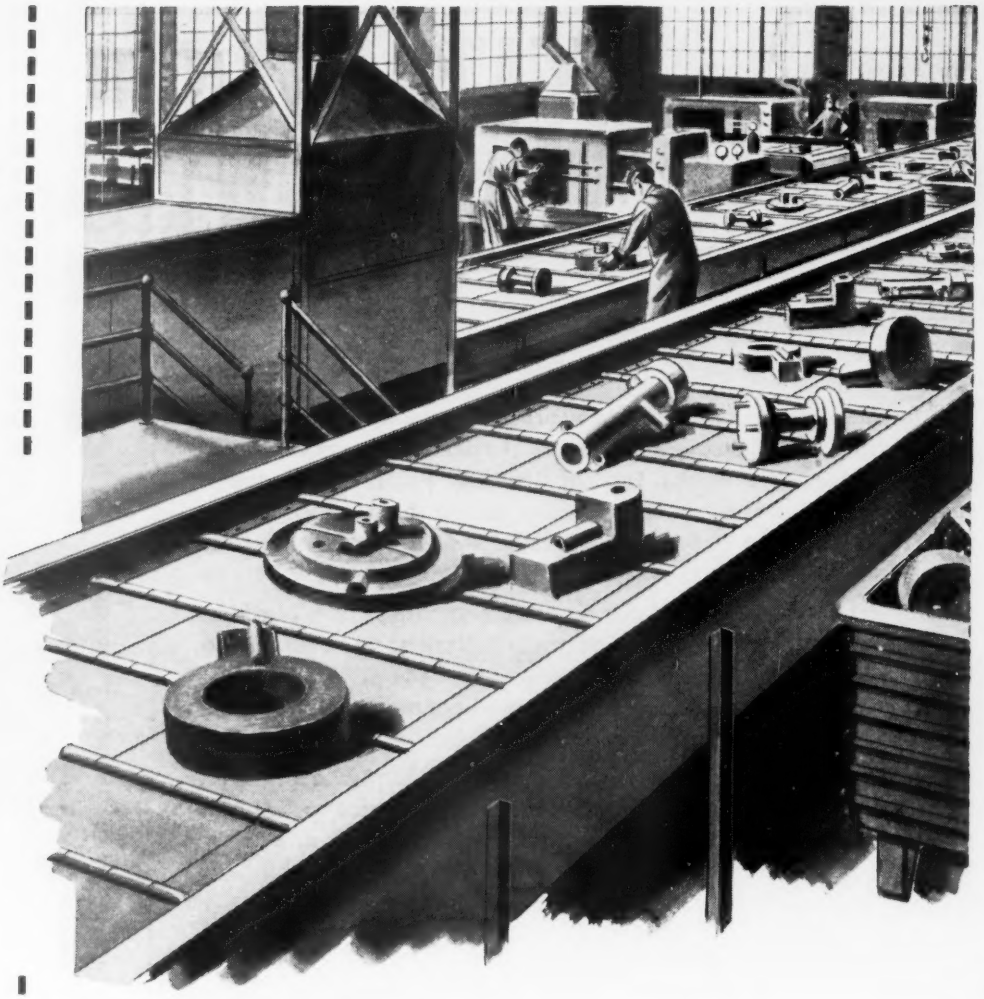
Company _____

Address _____

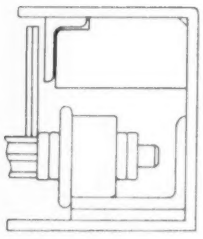
City_____ Zone____ State_____

REPUBLIC STEEL

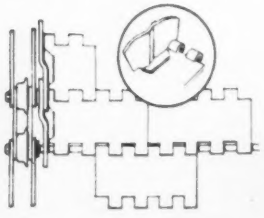
the belt with 9 lives



May-Fran hinged-steel conveyor belt . . . out performs them all in the foundry



Drawing shows construction details of "skirt" which prevents entry of foreign matter and protects side chains.



Outside links incorporate interlocking wings . . . remain positively engaged at all times.

May-Fran Belting is precision formed . . . specifically designed and developed to handle hot, heavy and the most abrasive parts. That's why it has nine lives.

Heavy gauge hinged-steel links are connected in horizontal rows by means of high-carbon steel rods. Side chains become an integral part of the locking wings which remain positively engaged at all times. Link and rod construction eliminates fall-through.

Widths furnished from 6-inches to 6-feet can meet your specifications for a steel conveyor belt of any length or carrying capacity. Either solid or perforated links are available in 2½, 4, 6, 9 and 12-inch pitch lengths. For conveyor belting that out performs, out lives them all . . . specify May-Fran Hinged-Steel Conveyor Belting.

MAY-FRAN ENGINEERING, INC.

WRITE TODAY FOR LITERATURE

3073-MF

1692 CLARKSTONE ROAD • CLEVELAND 12, OHIO

DESIGNERS AND BUILDERS OF COMPLETE HANDLING SYSTEMS

telling the story of 'dag' dispersions

Compare Your Present Mold Wash With 'dag' Colloidal Graphite

Your Present Wash	'dag' Colloidal Graphite
1. *Fails to prevent all sticking?*	1. Molds, patterns, chills, cores . . . even push pins, shoulder screws, flask pins, and ladle interiors . . . take on a micron-thin, exceptionally slippery, *dry lubricating film that prevents all sticking.*
2. *Difficult to apply?*	2. **'dag'** mold washes can be sprayed on, painted on, or applied by dipping.
3. *Presents production problems?*	3. Speeds parting, assures smoother castings, eliminates binding and stripping. Chills tap off easily.
4. *Smokes?*	4. Water dispersions of **'dag'** Colloidal Graphite eliminate irritating smoke caused by most parting compounds.

More advantages of **'dag'** parting compounds are to be found in Bulletin No. 425-A3. Write for your copy *today*.

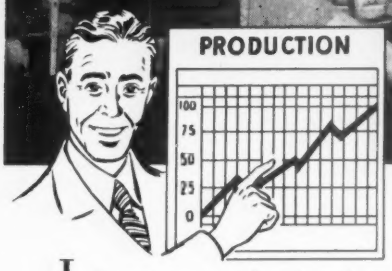
dag DISPERSIONS®

Acheson Colloids Company, Port Huron, Mich.

. . . also ACHESON COLLOIDS LIMITED, LONDON, ENGLAND

try 'dag' resin-bonded dry films for permanent lubrication

INCREASE FOUNDRY OUTPUT WITH EFFICIENT TRAMRAIL HANDLING



25% to 100% Greater Production Often Obtained

Is it greater production that you want? Are lower costs important? Would you like these advantages without enlarging your present plant? Then consider Cleveland Tramrail overhead materials handling equipment.

In many instances the installation of Cleveland Tramrail cranes, bridges, carriers, hoists, etc. have so cut handling time, speeded production and brought about other advantages, that 25% to 100% greater output is obtained with the same floor area.

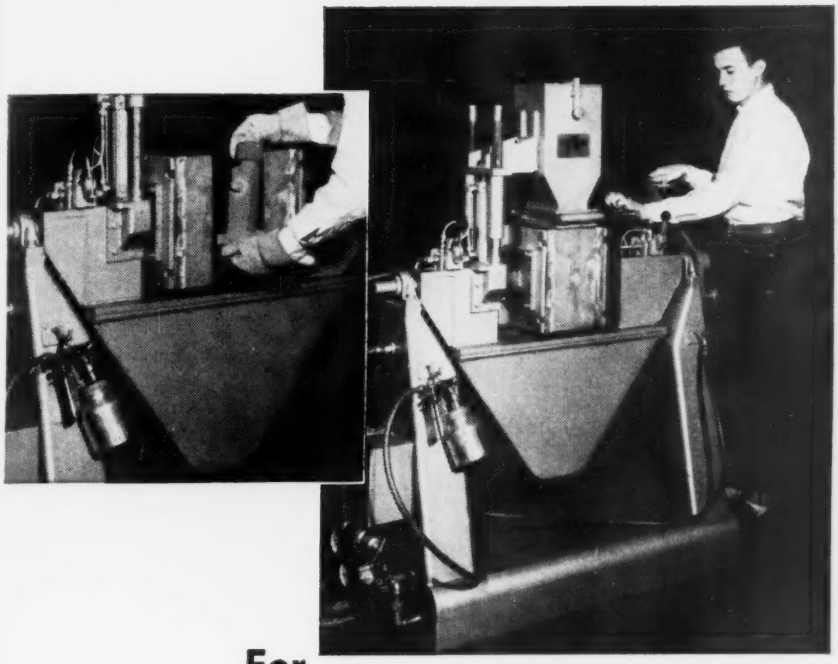
Cleveland Tramrail is adaptable to all size and type foundries, and just as great relative savings can be made by a 10-man foundry as one employing 1000. The equipment is available for hand or electric operation, or various combinations thereof, to best serve the requirements.

Why not get the facts on the modern overhead Tramrail way of foundry handling? Learn first hand what it has done for hundreds of other foundries. This might well lead to an entirely new and profitable future course for your company.

GET THIS BOOK!
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3832 East 286th Street, Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT



For low cost, accurate, shell molding, specify...

Rugged and compact, the MC-4 core machine designed by Shalco Engineering Corp., Palo Alto, California, produces a finished core by the shell process every 30 to 50 seconds. Built-in heaters complete the curing in the corebox, eliminating core driers, ovens and handling; cores are delivered fully cured and ready for setting. Requiring power of only 5 KW, 200V and an air pressure of 100 psi., the MC-4 has a capacity of up to 12"x9"x6".

DOW CORNING 8 EMULSION

Assures Fast, Positive Release • Keeps Patterns Clean Nonflammable and Noncorrosive • Dilutible in Hard or Soft Water • Resists Creaming or Separating

Especially designed for the shell process, Dow Corning 8 Emulsion, a silicone parting agent, can't break down to form a carbonaceous deposit on patterns. Cleaning costs are minimized and you increase production of shells with consistently high dimensional accuracy. For more information and a free trial sample, return the coupon today.

DOW CORNING MIDLAND

first in silicones

DOW CORNING SILICONES

DOW CORNING CORPORATION MICHIGAN

ATLANTA CHICAGO CLEVELAND DALLAS DETROIT LOS ANGELES NEW YORK WASHINGTON, D.C. (SILVER SPRING, MD.)

CANADA: DOW CORNING SILICONES LTD., TORONTO ENGLAND: MIDLAND SILICONES LTD., LONDON FRANCE: ST. GOBAIN, PARIS

DOW CORNING SILICONES

in the Foundry

FIGHTING CORROSION caused by soda ash? Try a silicone based paint. A southern foundry found soda ash was corroding the frames of fan motors operating in exhaust stacks. A year ago the frames were coated with a silicone based paint. No visible signs of corrosion have appeared since; the silicone paint is still in excellent condition.

▼

ROLLER BEARING LUBRICATION was a major headache to one eastern foundry. The bearings, located on a sintering conveyor, required daily lubrication with a bentonite base grease to maintain operation at oven temperatures in the range of 350 F. After changing to Dow Corning 44 silicone grease, foundry maintenance men cut the relubrication schedule to once every eight weeks.

▼

OVERLOADS AND HIGH TEMPERATURES are death to organic insulated motors. Take, for example, the 5 hp Class A drive motor on a hot ingot conveyor in another eastern foundry. Operating on a 20 second start and stop cycle, the motor hardly gets up to speed before it is shut down. This, plus extremely high ambient temperatures caused the motor to burn out about every six weeks.

Four years ago the motor was rewound with Class H insulation made with Dow Corning silicones. The Class H job cost about twice as much as a Class A rewind but the silicone insulated motor hasn't failed yet. That's more than 30 times the life. Imagine the savings in rewind costs!

For more information about any of these Dow Corning silicone products,

Send this coupon TODAY

DOW CORNING SILICONES

DOW CORNING CORP.
Dept. 5901
Midland, Michigan

Gentlemen: Please send me

- ☐ Free sample of Dow Corning 8 Emulsion
- ☐ Silicone-based Protective Coatings
- ☐ Description of Silicone Greases
- ☐ Performance data on Class H Insulation

Name_____

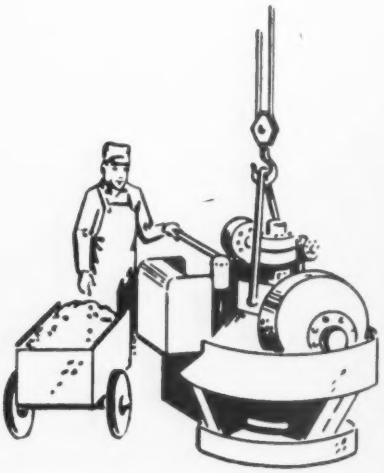
Company_____

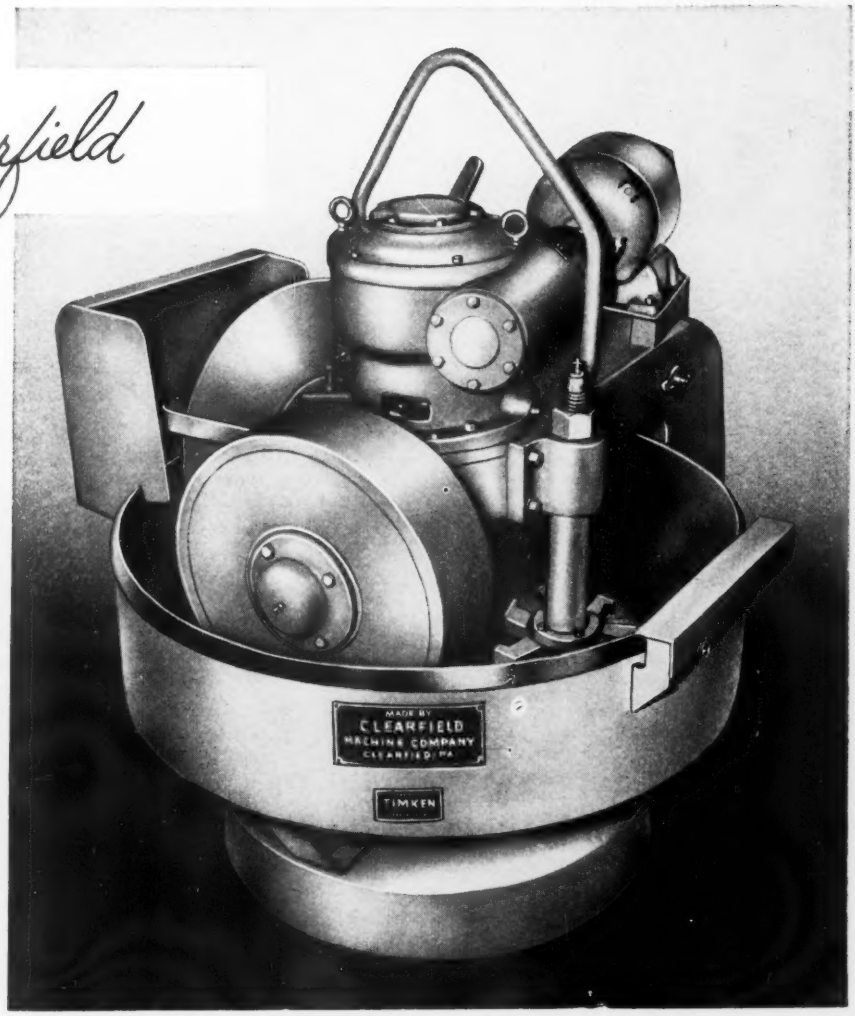
Address_____

for *Portability*

THE *Clearfield*

No. 414





This 414 Clearfield Mixer has a wide field of use in either large or small plants in which the plan of sand preparation is built around the portability of the mixing unit. It may be suspended from a crane or monorail hoist and may be thus carried over the entire molding floor eliminating the need for conveying equipment. The machine is perfectly balanced and may be loaded, operated and discharged while suspended above the floor. Where crane facilities are not available for this purpose, the mixer may be equipped with roller bearing casters by means of which it may be moved anywhere over a level floor. The 414 delivers four cubic feet per batch.

CLEARFIELD
MACHINE COMPANY
CLEARFIELD
PENNSYLVANIA, U. S. A

Miller AIR CYLINDERS

Ideal For Toughest Foundry Service!

ARD
HROME PLATED
STON RODS
event Scratch-Damage,
cks and Rust

RT WIPER SEALS
otect Rods, Seals, Bushings

LID STEEL HEADS,
PS and MOUNTINGS
minate Breakage

RASS BARRELS
minate Rust and Corrosion

Miller Standard Air Cylinders are so soundly designed and sturdily constructed that, even under the severe abrasive conditions of foundry service, they provide extremely long life without requiring packing replacement or other maintenance.

They are offered in a complete line of "custom-built" units available on normal scheduled delivery in *thousands* of combinations of bore, stroke and mounting to meet every foundry need.

They feature the SPACE-SAVING SQUARE DESIGN originated by Miller in 1945 and fully met the J. I. C. Pneumatic Standards years before their adoption in 1950.

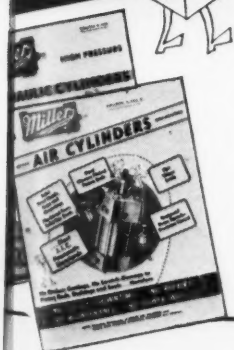
Immediate Delivery From "Stock"

Rapidly expanding list of Miller "Stock" Cylinders for *immediate, off-the-shelf delivery* now includes *thousands* of different combinations of bore, stroke and model and covers both air and hydraulic cylinders—cushioned and non-cushioned.

These are in addition to Miller "Custom-Built" Cylinders available on normal scheduled delivery in an almost infinite selection.

"Stock" Boosters also available for immediate delivery.

Write for Complete Catalog and Stock List!



WRITE FOR CYLINDER BULLETINS A-105 and H-104

Complete Miller cylinder line includes: air cylinders, 1½" to 20" bores, 200 PSI operation; low pressure hydraulic cylinders, 1½" to 6" bores for 500 PSI operation, 8" to 14" bores for 250 PSI; high pressure hydraulic cylinders, 1½" to 12" bores, 2000-3000 PSI operation. All mounting styles available.

SALES AND SERVICE FROM COAST TO COAST

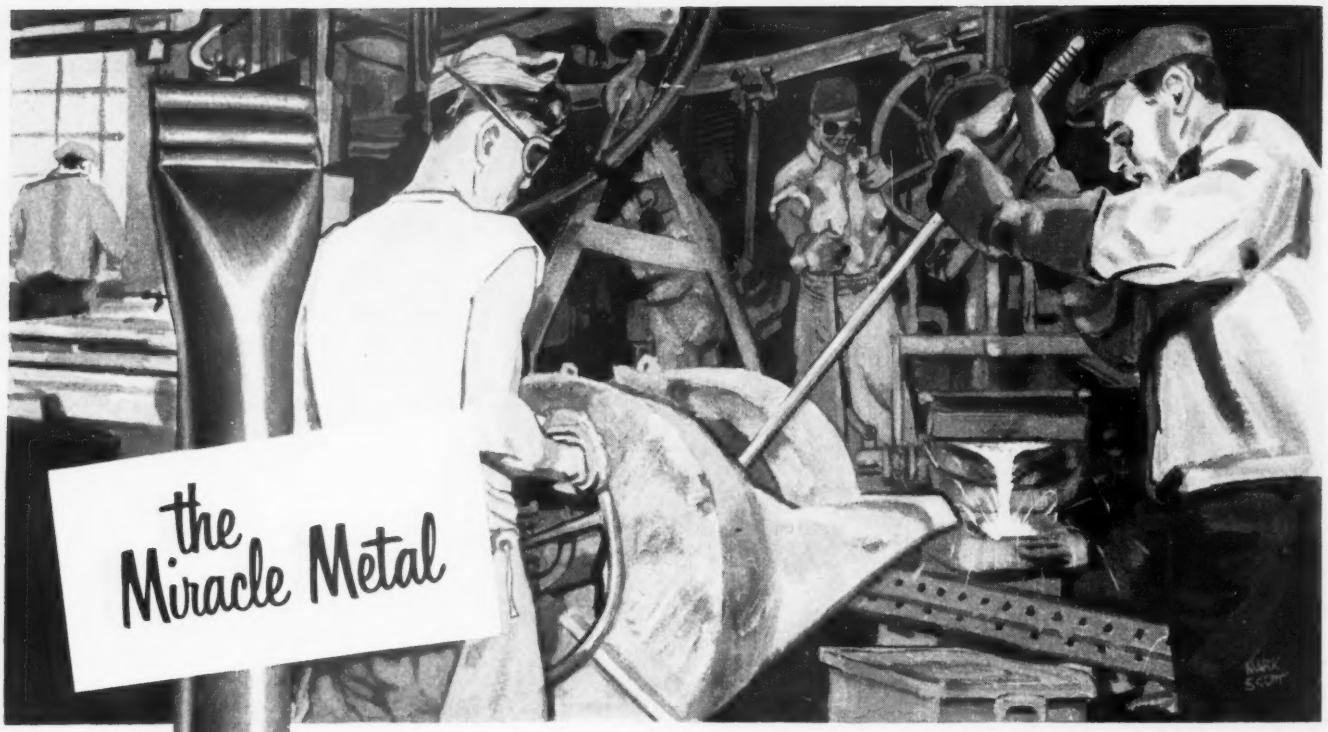
CLEVELAND • YOUNGSTOWN • DAYTON • PITTSBURGH • PHILADELPHIA • BOSTON • HARTFORD • NEW YORK CITY • BUFFALO • ST. PAUL • GRAND RAPIDS • DETROIT • FLINT • FORT WAYNE • SOUTH BEND • INDIANAPOLIS • MILWAUKEE • LOUISVILLE • KANSAS CITY • SEATTLE • LOS ANGELES • SAN FRANCISCO • BALTIMORE • DENVER • ST. LOUIS • MOLINE • CHICAGO • HOUSTON • TORONTO, CANADA and OTHER AREAS

MILLER FLUID POWER CO.

(Formerly MILLER MOTOR COMPANY*)*

Miller 2034 N. HAWTHORNE AVE., MELROSE PARK, ILL.

AIR & HYDRAULIC CYLINDERS • BOOSTERS • ACCUMULATORS
COUNTERBALANCE CYLINDERS



LITHIUM

Only 0.005% makes a sounder nonferrous casting

Lithium economics and technique are both within the limits of everyday nonferrous foundry operation. A small slug (2¼ grams) of metallic Lithium added to a charge of molten copper effectively removes dissolved oxides and gases. End result is an improved, more uniform casting. By adding Lithium the surer way—in the handier *cartridge* form—you eliminate the "by-guess-and-by-gosh" formulation too common with less satisfactory methods.

Specifically, tensile strength and elongation are increased, porosity decreased, and grain size reduced. Characteristic low density causes the Lithium products formed to float to the surface where they are easily removed as slag. Again, Lithium Cartridges give you a sounder casting with less trouble and at less cost.

Tests under production conditions in nonferrous foundries have long established Lithium in metallurgy as a degasifier, deoxidizer, desulfurizer and general purifying agent. As a degasifier of Nickel Bronze, for example, Lithium Cartridges make possible a dense, fine-grained metal. Hermetically sealed in copper tubing, three sizes—2.25, 4.50 and 9.0 grams—are available.

Investigate Lithium Cartridges. Write for details of actual foundry tests. The small amounts of Lithium required put this revolutionary technique within *your* reach.

The application of Lithium requires no radical changes in conventional melting and casting processes. The cartridges are *quickly* introduced into the lower part of the crucible by wiring them into an inverted piece of angle iron or stainless steel, welded to a long rod handle, to prevent the light cartridge from rising to the surface before the reaction has taken place.

. . . trends ahead in industrial applications for Lithium

LITHIUM CORPORATION OF AMERICA, INC.
Suite B
Rand Tower
Minneapolis 2, Minnesota

MINES: Keystone, Custer, Hill City, South Dakota · Bessemer City, North Carolina · Cat Lake, Manitoba · Amos Area, Quebec
CHEMICAL PLANTS: St. Louis Park, Minnesota · Bessemer City, North Carolina · RESEARCH LABORATORY: St. Louis Park, Minnesota

At Janks Sandblasting Co., The Pangborn Blastmaster® Barrel

Cuts Cleaning Time from 1¼ Hours to 3 Minutes!

The Janks Sandblasting Company, Syracuse, N. Y., is a commercial blast cleaning firm handling ferrous and non-ferrous work. Recently the installation of a Pangborn Blastmaster Barrel, in a special below floor-level pit, has enabled Owner Bob Janks to lower his operating costs and charge his customers much less. How so? Certain typical items used to require an hour and 15 minutes to clean. Today the Blastmaster cleans them in *3 minutes* and gives a fine finish! No wonder Mr. Janks calls the Blastmaster "an excellent machine"!

Do *you* want a *better* finish . . . in *less* time . . . at *lower* cost? Then investigate the Pangborn Blastmaster Barrel, available in 1½, 3, 6, 12, 18 and 27 cu. ft. capacities. The letter that takes a minute to write may save you hundreds of dollars a year! Write for Bulletin 225: PANGBORN CORPORATION, 1400 Pangborn Boulevard, Hagerstown, Md.

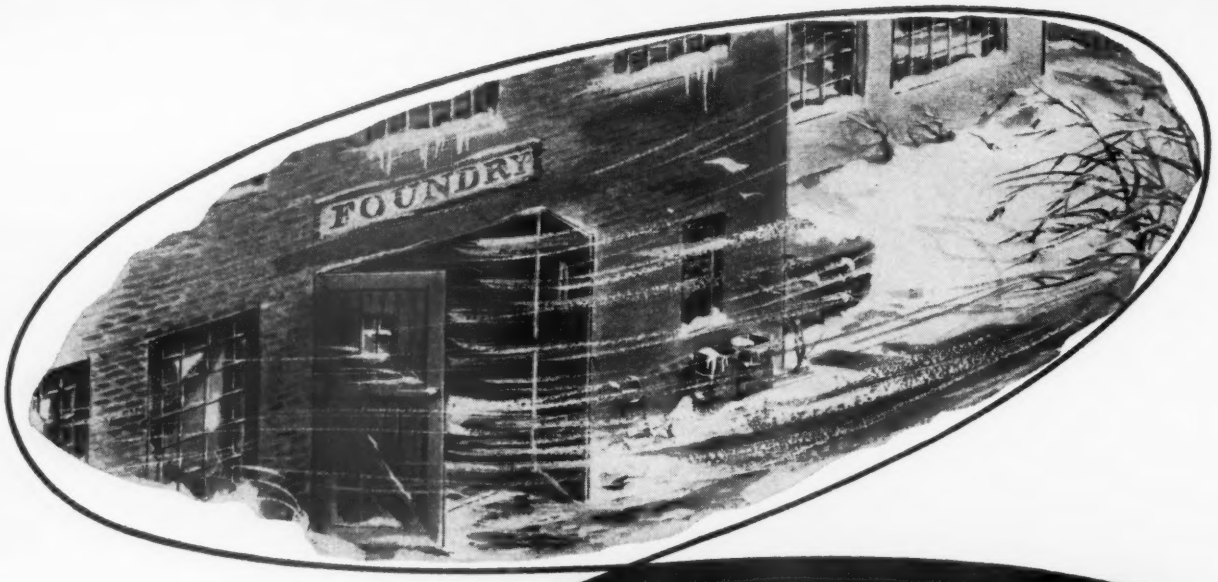
Pangborn

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control Equipment.

MEMBER FEMA

BLAST CLEANS CHEAPER
with the right equipment for every job

*U. S. Patent # 2184926 (other patents pending)



Now is the time to check WINTER WASTE of valuable warm air!

Cold weather can be costly. A check of your foundry's Building Ventilation Balance now, may show that heat is being wasted and the comfort of employees impaired.

A Schneible BVB Dust Control System can reduce heat loss from your building by as much as 75%.

Compensating Air Uni-flo Ventilation Hoods minimize exhaust of needed building heat because each unit balances its own air intake and exhaust. These Schneible Hoods offer scientifically controlled air patterns that prevent unnecessary suction of surrounding warm air.

Check that heat loss now—check with Schneible engineers for complete control of dust, fumes and Building Ventilation Balance. Write for literature on BVB.

FOUNDRY EQUIPMENT MEMBER FEMA MANUFACTURERS ASSOCIATION INC.

CLAUDE B. SCHNEIBLE COMPANY

P. O. Box 81, North End Station

Detroit 2, Michigan

SCHNEIBLE

CABLE ADDRESS: CBSCO
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LATE NEWS

DECEMBER 27 1954

EQUIPMENT SALES UP: Orders placed for foundry equipment have turned upward from the low level of late summer. Sales index of the Foundry Equipment Manufacturers Association for October, latest month reported, was 147.5 per cent of the 1947-1949 monthly average. This compares with 68.3 in September and 87.2 in October, 1953, and was the highest index since last January.

NAMED TO ODM: Edward F. Phelps Jr. has been appointed assistant director for stabilization, Office of Defense Mobilization, succeeding Glenwood J. Sherrard, Boston hotel operator. Mr. Phelps will be responsible for guiding further development of a national, co-ordinated stabilization program that would be needed in the event of a future emergency. This assignment would include writing price controls, for castings as well as for other products. Mr. Phelps joined the Office of Price Administration in 1942 as director of the food price division. Since then he has served with the government in various capacities relating to stabilization and also has been connected with industry.

INVESTMENT CASTING: Number of manufacturers of investment castings has increased more than 200 per cent to about 100 firms since 1945. This is shown in a recent survey by the Investment Casting Institute. While the industry's products go into many fields, government work accounts for nearly two-thirds of the total volume and greater diversification in markets is being sought. Three-fourths of all producers are making castings for electronics equipment, 67 per cent for aircraft instruments and 58 per cent for aircraft engines.

MORE NICKEL AVAILABLE: Civilian users can obtain more nickel in 1955 than they could in 1954. This is the prediction of Dr. John F. Thompson, chairman, International Nickel Co. of Canada Ltd. He estimated that free world nickel production next year will approximate 207,500 tons. The 1954 total is placed at 195,000 tons, or about 50 per cent higher than the pre-Korean 1949 output.

Dr. Thompson said that although output of nickel-chromium alloy castings decreased in 1954, average nickel content was higher. He added that experimental work with stationary and mobile gas turbines shows promise of developing a new market for these castings.

BACKLOG RISING: After a downward trend that persisted for over three years, gray iron casting unfilled orders definitely seem to have reversed their direction and to be rising steadily. Unfilled orders stood at nearly 2.4 million tons in March, 1951, when they started down. They went under 2 million tons in October, 1951, and under 1 million tons in November, 1953. By May, 1954, the backlog had reached a low of 775,278 tons, but then it started back up and has risen each month since. The Sept. 30 total, the latest available, was 860,779 tons, against 829,505 tons the end of August.

BRASS CASTINGS: Shipments of copper-base alloy castings for military purposes declined steadily during 1954. From a high of 8000 tons in the fourth quarter of 1953 the total slipped to 5700 tons in the first quarter of 1954 and to 4700 tons and 4000 tons, respectively, in the second and third quarters.

ALUMINUM PRODUCTION: Primary aluminum production apparently hit an all-time high in 1954, although final returns are not yet in. Total production through November reached 2,667,061,560 lb, compared with 2,283,446,289 lb for the same period in 1953. The November figure, 242,503,923 lb, is less than 10 million lb under July, 1954, the all-time record month, and is over 30 million lb more than the figure for November, 1953.

EXPORTS OF SCRAP: Tighter restrictions imposed recently on exports of iron and steel scrap apparently will not be followed by any additional limitations for the present. However, there are some expectations that further brakes will be applied should present limitations prove ineffective.

Scrap exports the first nine months of 1954

totaled 844,240 tons, more than half of which went to Japan and Mexico. Other largest buyers were Western Germany, Yugoslavia and the United Kingdom. Exports licenses issued the first 11 months covered 2,303,046 tons of ferrous scrap; about one-fourth of this was licensed in November.

In contrast, U. S. exports of copper scrap have declined. Shipments of alloy scrap were off 40 per cent in the third quarter from the preceding three months, and exports of unalloyed copper scrap were down 50 per cent.

CONFER ON DUCTILE IRON: A series of conferences designed to acquaint engineers with the properties and applications of ductile iron has been started by the International Nickel Co. The first of these were held at the Worthington Corp., Harrison, N. J. and at the M. W. Kellogg Co., New York.

PERSONALS: Dan Pendergast has succeeded the late Ray Hunter as New England representative for Archer-Daniels-Midland Co.'s Foundry Products Division . . . Canadian Car & Foundry Co. Ltd., Montreal, has appointed J. G. Mitchell as vice president in charge of manufacturing, railway car equipment, and G. L. McMillin as assistant vice president of the steel foundry . . . A. F. Pfeiffer, Allis-Chalmers Mfg. Co., has been appointed industrial advisor of the AFS student chapter at the University of Wisconsin . . . Hjalmar Nilsson, plant manager of Magnesium Co. of America, East Chicago, Ind., has been appointed chief engineer . . . Robert C. Woodward, formerly chief metallurgist, Bucyrus-Erie Co., Milwaukee, has retired.

MISCELLANY: Dornbeck Furnace & Foundry Co., Cleveland, has established a separate division for the manufacture of heat pumps and related equipment for homes and industrial and commercial buildings . . . Mexico Refractories Co., Mexico, Mo., has opened a new warehouse at 2431 East Marginal Way, Seattle, its fourth on the West Coast . . . Department of Commerce shortly will start a complete Census of Manufactures, the first since 1947. Forms will go out soon to all industries for recording of 1954 business activities.

PRICES OF FOUNDRY METALS AND COKE

(As of Dec. 23, 1954)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE	
Connellsville	$16.50–17.00
OVEN	
Birmingham	$22.65
Buffalo	25.00
Chicago	24.50
Detroit	25.50
Erie, Pa.	25.00
Everett, Mass.	23.50
Indianapolis	24.25
Kearney, N. J.	24.00
Lone Star, Tex.	18.50
Milwaukee	25.25
Montreal, Que.	26.25
Painesville, O.	25.50
Philadelphia	23.00
Portsmouth, O.	24.00
St. Louis, del.	26.00
St. Paul	23.75
Swedeland, Pa.	23.00
Terre Haute, Ind.	24.05

PIG IRON

(Per gross ton f.o.b. furnace)

	No. 2 Foundry	Malleable
Bethlehem, Pa.	$58.50	$59.00
Birmingham	52.88	....
Buffalo	56.50	57.00
Chicago	56.50	56.50
Cleveland	56.50	56.50
Everett, Mass.	61.00	61.50
Fontana, Calif.	62.50	....
Geneva, Utah	56.50	....
Granite City, Ill.	58.40	58.90
Lone Star, Tex.	52.50	52.50
Neville Island (Pittsburgh)	56.50	56.50
Steelton, Pa.	58.50	59.00
Swedeland, Pa.	58.50	59.00
Toledo, O.	56.50	56.50
Troy, N. Y.	58.50	59.00
Youngstown, O.	....	56.50

NONFERROUS INGOT

(Cents per pound, carlots)

BRASS AND BRONZE: Red brass, No. 115, 30.00; tin bronze, No. 225, 41.00; No. 245, 34.75; high-leaded tin bronze, No. 305, 34.00; No. 1 yellow, No. 405, 25.75; manganese bronze, No. 421, 27.75.

ALUMINUM: 99 per cent plus, primary ingots 22.2. Secondary No. 12 alloy 20.75-21.25. Deoxidizing grades: No. 1 21.75-22.50; No. 4 19.25-19.75.

MAGNESIUM: 99.8 per cent notched ingots 27.75, f.o.b. Freeport, Tex. (10,000 lb or more).

COPPER: Electrolytic 30.00, delivered Connecticut valley.

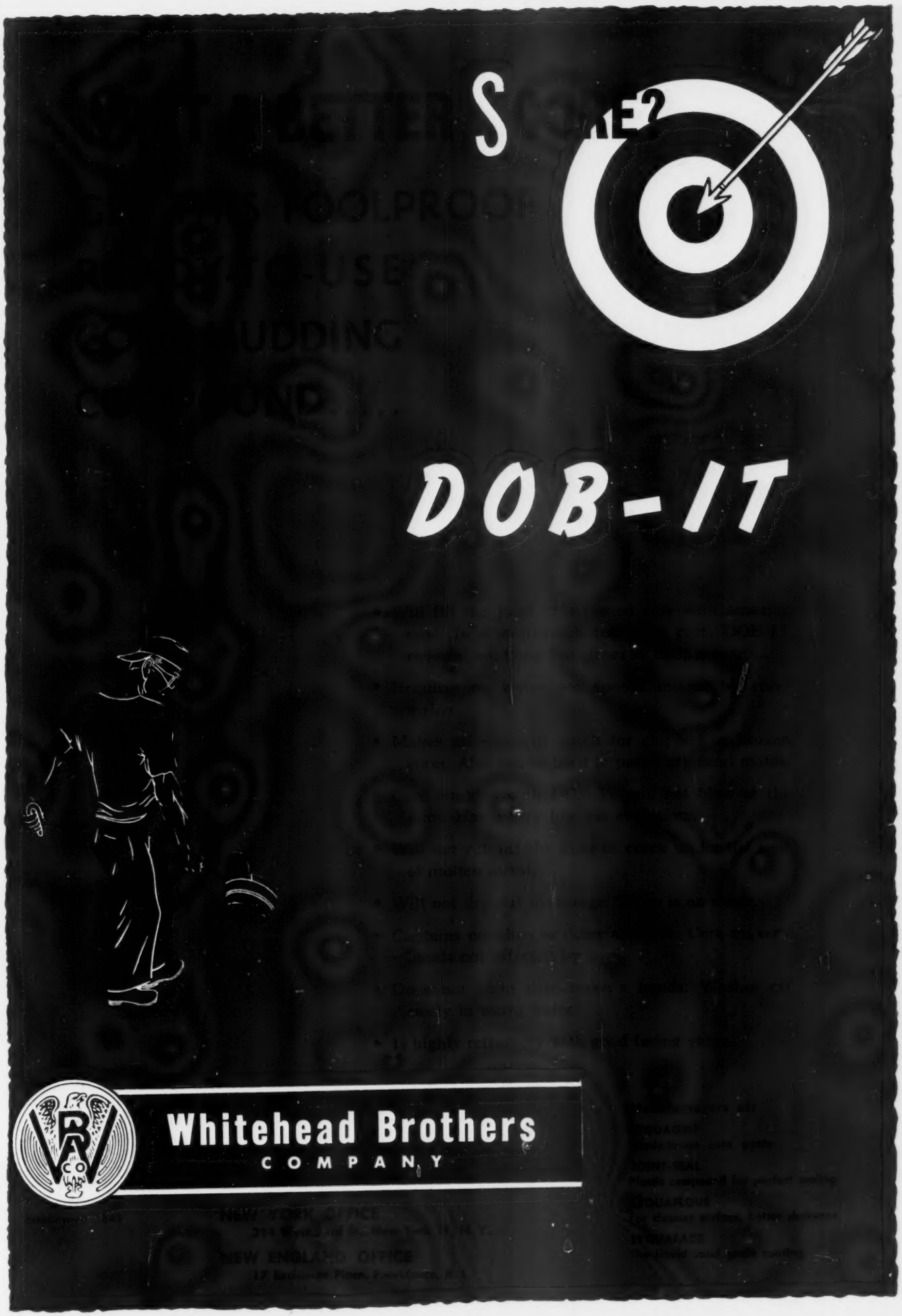
ZINC: High grade 12.85, delivered. Die casting alloy 15.50, delivered.

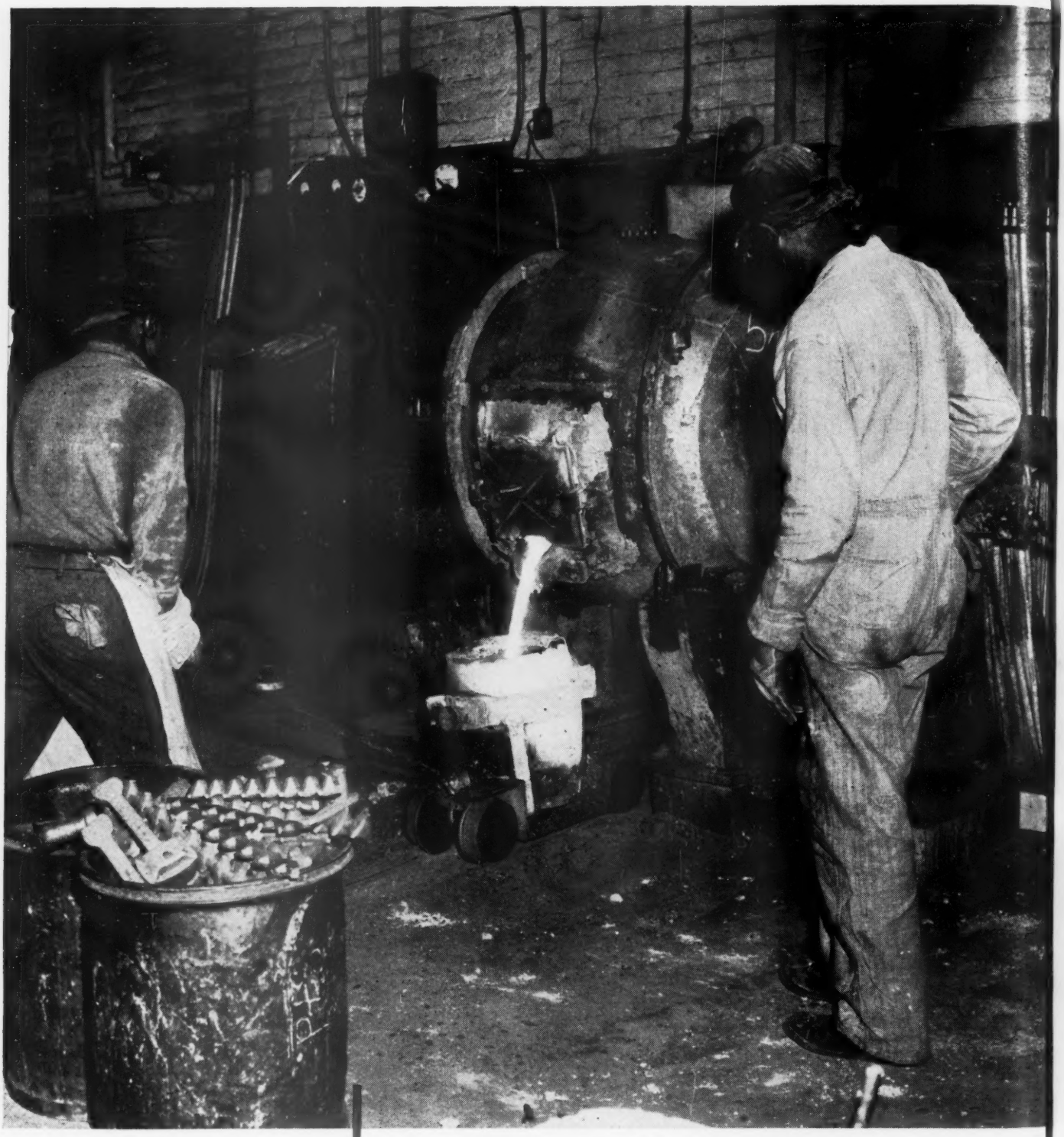
IRON AND STEEL SCRAP

(Consumer prices per gross ton delivered, except as otherwise noted)

	No. 1 Heavy Melting Steel	No. 1 Cupola Cast	Heavy Breakable Cast	Clean Auto Cast	Machinery Cast	Malleable	Short Steel Rails
Birmingham	$26.00–27.00	**$45.00–46.00	.....	.....	.....	.....	$40.00–41.00
Boston*	**22.00–23.00	**29.00–30.00	.....	.....	**32.00–33.00	.....	.....
Buffalo	30.00–31.00	**38.00–39.00	.....	.....	**43.00–44.00	.....	42.00–43.00
Chicago	32.00–34.00	39.00–40.00	.....	42.00–43.00	42.00–43.00	42.00–44.00	50.00–52.00
Cincinnati*	**30.00–31.00	**39.00	**36.00	.....	**45.00	.....	47.00–48.00
Cleveland	32.00–33.00	44.00–45.00	30.00–31.00	44.00–45.00	44.00–45.00	44.00–45.00	46.00–48.00
Detroit*	**27.00	**34.00	**25.00	**38.00	.....	**30.00	.....
Los Angeles	20.00	**42.00–44.00	.....	.....	.....	.....	.....
New York*	26.00–27.00	29.00–30.00	.....	.....	.....	.....	.....
Philadelphia	31.50–32.00	35.00–36.00	36.00–36.50	.....	42.00–43.00	42.00–43.00	.....
Pittsburgh	33.00–34.00	36.00–37.00	30.00–31.00	.....	41.00–42.00	.....	46.00–48.00
St. Louis*	30.00	40.00	32.50	41.00	.....	.....	46.00
San Francisco	24.00	43.00	36.00	39.00	48.00	.....	.....
Seattle	27.00	**32.00–35.00	**23.00	.....	.....	.....	.....

*Brokers' buying prices. **F.o.b. shipping point.


DOB-IT
Whitehead Brothers
COMPANY



Typical Furnace Operating Data

Furnace type LFN, 500 lb., 150 KW rating

Total hours operation	7¼
Total number heats	5
Weight per heat	600 lbs.
Total metal melted	3000 lbs.
Total KWH used	965
Ave. KWH/ton	643
Ave. melt time/heat	54 min.

Refractory life and electrode consumption—(400-600 heats per lining and 8 lbs. per ton of iron melted.)

Ductile Iron Production

In Detroit ROCKING *Electric Furnaces*

Production of this useful, high strength alloy moves along with great efficiency and predictability at Penberthy Injector Company, Detroit. The alloy is prepared in Detroit Rocking Electric Furnaces, 600 lbs. to a heat, a ton and a half per furnace per shift.

Plant production of castings can be scheduled and carried out in an orderly, economical way. The Detroit furnace furnishes molten metal of the desired composition in a set time cycle.

A Versatile Furnace

The Detroit Rocking Electric Furnace, used here for ductile iron, is equally useful in melting other ferrous and non-ferrous metals.

The indirect arc used in these excellent furnaces minimizes carbon pick-up and resulting variations in metal composition. Positive control of temperature, optimum utilization of power are benefits, too.

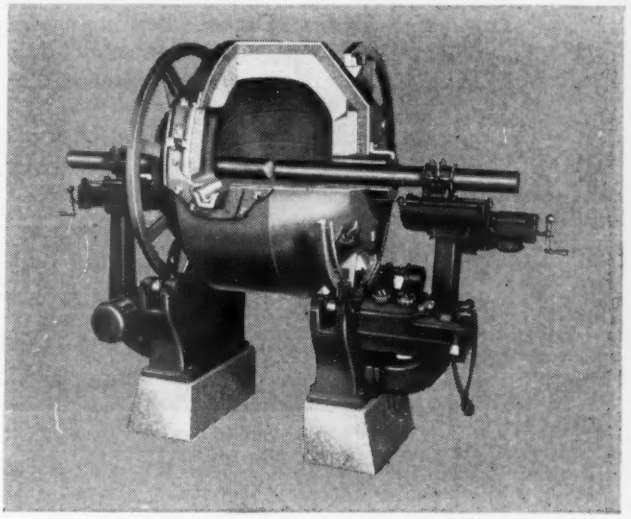
The controlled rocking action helps these furnaces operate with greater economy, since the molten metal washes over and picks up heat from a large area of the refractory. The motion of the metal assures complete homogeneity. Automatic controls, once set, duplicate the most favorable melting cycle time after time.

Get Full Information

With Detroit Rocking Electric Furnaces, you get less metal shrinkage, more usable metal per heat, more uniform product, longer refractory life, simple maintenance and exceptionally long service life.

Send us your operating data. Ask us to tell you how a Detroit furnace can do a better job for you.

Furnace capacities from 10 to 4000 pounds.



Cutaway view of the Detroit Rocking Electric Furnace, showing engineering and construction features. Rocking action assures maximum heat utilization.

DETROIT ELECTRIC FURNACE DIVISION

Kuhlman Electric Company • Bay City, Michigan

Foreign Representatives: in BRAZIL—Equipamentos Industrias, "Eisa" Ltd., Sao Paulo; CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway, New York 7, N. Y.; MEXICO: Cia Proveedora de Industrias, Atenas 32-13, Apartado 27A3, Mexico 6, D. F., Mexico; EUROPE, ENGLAND: Birlec, Ltd., Birmingham.

ELECTROMET

Trade-Mark

ALLOYS

"Quality Plus Service"

Boron . . Ferroboron (in minimum 10.00% and 17.50% Boron grades), Manganese-Boron, Nickel-Boron and Boron Carbide.

Calcium . . Calcium-Silicon, Calcium-Manganese-Silicon, and Calcium Metal.

Chromium . . "Simplex" Low-Carbon Ferrochrome (0.010% and 0.025% maximum Carbon), Low-Carbon Ferrochrome (from 0.02% to 2.00% maximum Carbon), Nitrogen-Bearing Low-Carbon Ferrochrome, High-Carbon Ferrochrome, Exothermic Ferrochrome, Exothermic Silicon - Chrome, "EM" Ferrochrome - Silicon, "EM" Ferrosilicon-Chrome, "SM" Ferrochrome, Foundry Ferrochrome, Electrolytic Chromium Metal, and other Chromium Alloys.

Columbium . . Ferrocolumbium and Ferrotantalum-Columbium.

Manganese . . Standard Ferromanganese, Low- and Medium-Carbon Ferromanganese, Low-Iron Ferromanganese, "Mansiloy" Alloy, Manganese Metal, and other Manganese Alloys.

Silicomanganese . . In maximum 1.50%, 2.00%, and 3.00% carbon grades.

Silicon . . Ferrosilicon in all grades, including both regular and low-aluminum material, Silicon Metal, "SMZ" Alloy, Magnesium Ferrosilicon, and other Silicon Alloys.

Titanium . . Low-Carbon Ferrotitanium, Silicon-Titanium, and Manganese-Nickel-Titanium.

Tungsten . . Ferrotungsten, Tungsten Powder, Calcium Tungstate, and Calcium Tungstate Nuggets.

Vanadium . . Ferrovanadium in all grades, Vanadium Oxide (Fused), Sodium Polyvanadate (Red Cake), and Ammonium Metavanadate.

Zirconium . . 12 to 15% and 35 to 40% Zirconium Alloys, and Nickel-Zirconium.

"EM" Briquets . . Silicon, Silicomanganese, Ferromanganese, Chromium, and Zirconium Briquets.

Information about these and other alloys and metals produced by ELECTROMET is contained in our new catalog "ELECTROMET Ferro-Alloys and Metals." Write for a copy.

Electro Metallurgical Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

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Electro Metallurgical Company, Division of Union Carbide Canada Limited, Welland, Ontario

"Electromet," "EM," "Mansiloy," "Simplex," "SM," and "SMZ," are trade-marks of Union Carbide and Carbon Corporation.

can you use these *Facilities?*

FOUNDRY DEPT.

LATHE DEPT.

MILLING DEPT.

...they're ready and able to serve you.

If you are looking for a reliable source for lathe work, milling and shaper work or non-ferrous castings (finish-machined or not) the chances are that City Pattern Foundry & Machine Company can fill the bill for you.

Each of these machining departments have a wide variety of modern equipment to handle almost any type of work that you might need. You'll find City Pattern Foundry and Machine Company an interested and economical source for both short and long runs.

In the foundry department you will find one of the most versatile and modern layouts in this part of the country. And, every conceivable laboratory control and testing device is on hand to insure chemical and physical specifications.

We will welcome the opportunity to give you more detailed information . . . won't you drop us a line or call in your specific requirements?

OUR NEW BROCHURE

Our colorful new brochure details our complete facilities for pattern work, foundry work and precision machining. Each department is completely illustrated with over forty recent illustrations. Your request will bring one to you promptly and without charge.

CITY PATTERN

FOUNDRY AND MACHINE CO.

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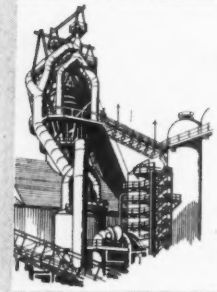
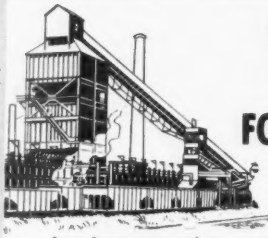
9 Reasons Why Your Foundry Can Cut Costs in the BIRMINGHAM District



High and Low Phosphorus PIG IRON

—available in ample supply from local producers.

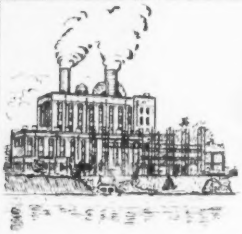


World's Finest FOUNDRY COKE

—in sizes to meet requirements of any cupola operation.

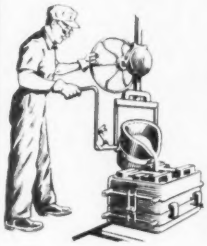
Abundant NATURAL GAS

—at favorable rates in all areas in the district.



Unlimited Low Cost POWER

—distributed by one of the South's largest, most progressive utilities.



Cooperative Native-Born LABOR

—many from families who have worked in foundries for two or three generations.

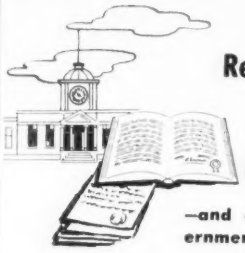
Superior TRANSPORTATION FACILITIES

Rail-Truck-Water-Air

—Birmingham—the South's rail center and trucking headquarters—is likewise served by the Warrior-Tombigbee river system.

Good MOULDING SAND

—prepared in the district for foundry use.



Reasonable TAX RATES

—and cooperative government at all levels.

CENTRAL LOCATION in the Heart of the Growing South

—cuts delivery time and costs to expanding Southern markets.

This unusual combination of manufacturing and distributing advantages is the reason why foundries making rough and precision castings are prospering in Birmingham.

* * * * *

Write this Committee or any of its undersigned members for detailed data on how to cut your foundry costs in this central district of the South.

BIRMINGHAM COMMITTEE OF 100

1914 Sixth Ave., N., Birmingham, Ala.

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Strong, sound irons for special castings are produced in this Lectromelt Furnace at Ferro Machine & Foundry Company, Cleveland.

It's easy to produce special alloy iron castings and profit too . . . with a Lectromelt*

There's a size Lectromelt Furnace for your foundry

"With our electric-furnace duplexing process, we are able to produce special irons for a great variety of castings requiring heat and wear resistance and ability to withstand extreme pressure . . . and do it economically."

In the duplexing process at Ferro Machine & Foundry Company, molten iron from the cupola is poured into the Lectromelt Furnace. There, elements are added or removed to give the exact composition specified and the charge is superheated electrically to achieve a fine-grain structure. Thus, special irons are produced as regular routine.

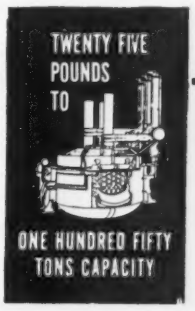
Lectromelt Furnaces range in capacities from 25 pounds to 150 tons, meeting every development and production requirement. They permit the most exact control of temperature and analysis. They're on melting, refining, smelting and reduction work. For Bulletin No. 9, telling you more about them, write Pittsburgh Lectromelt Furnace Corp., 314 32nd Street, Pittsburgh 30, Pa.

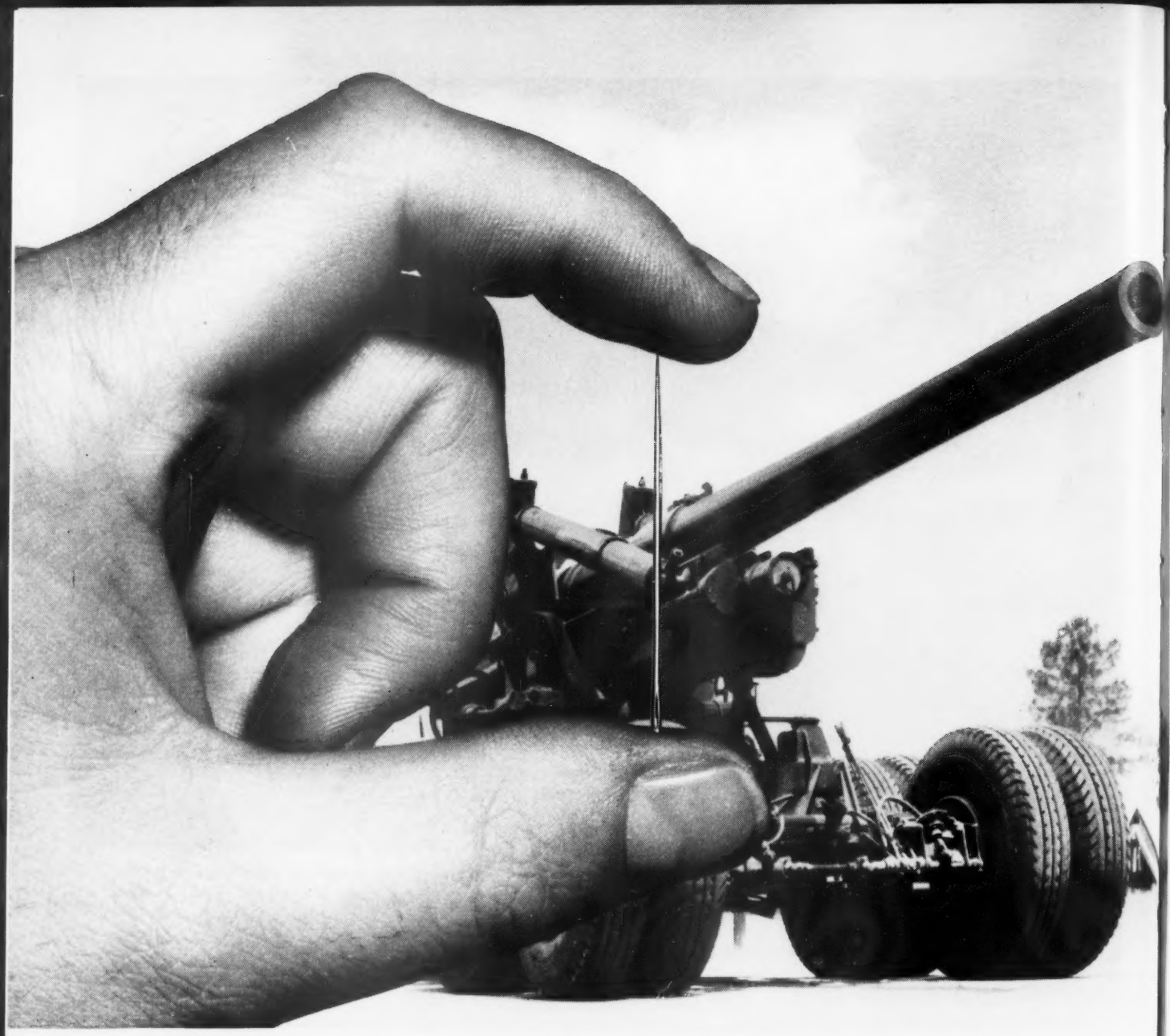
Manufactured in . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

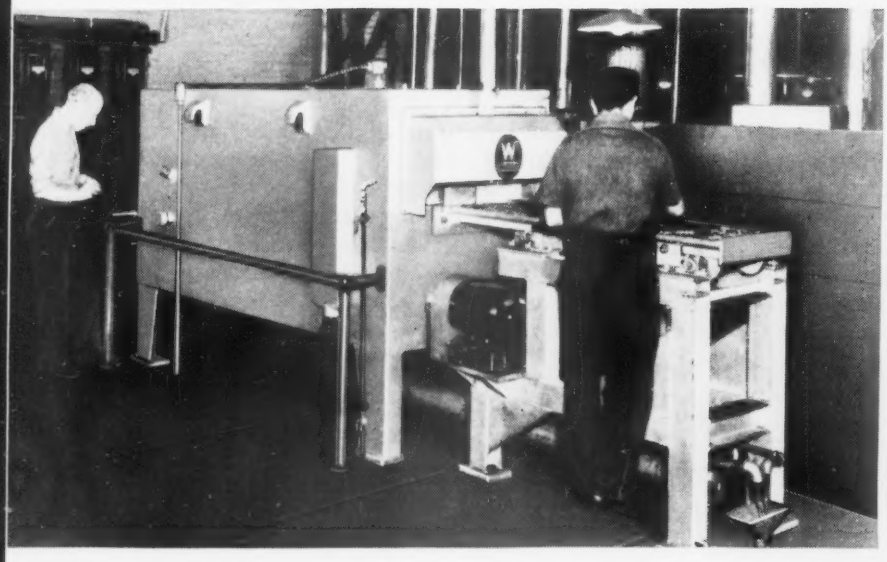
*REG. T. M. U. S. PAT. OFF.

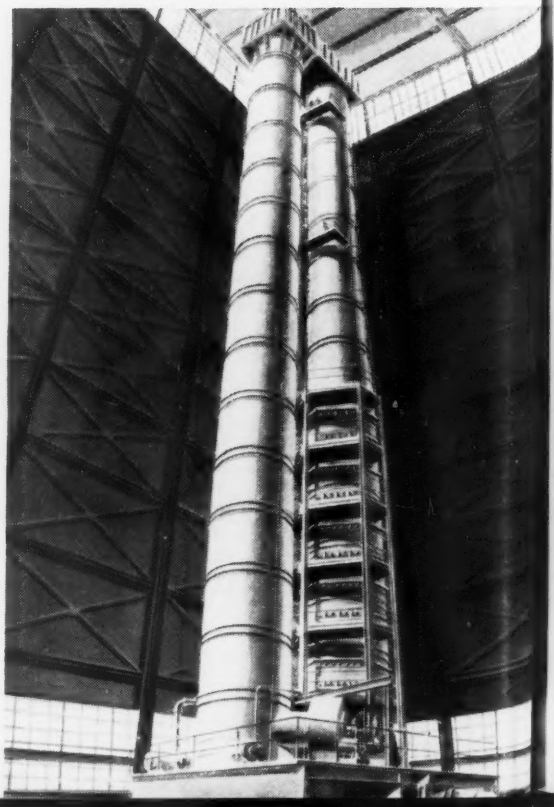
MOORE RAPID

WHEN YOU MELT... *Lectromelt*









FROM BOX TYPE TO ELEVATOR TYPE . . . this wide range of Westinghouse furnaces offers industry heat-treating units specially engineered for the smallest toolroom jobs on up to furnace capacities for massive parts treating. Accurate temperature control, uniform temperature distribution and low heat loss in Westinghouse furnaces assure high and constant quality level.

Needles to cannon barrels...

heat-treat them in Westinghouse furnaces

Across the board in heat-treating, for small jobs or mass production, Westinghouse makes the exact furnace needed. From manually operated box type to complex automatic conveyor units, Westinghouse furnaces assure the maximum in speed, quality and economy.

This complete line includes furnaces using either gas or electric heat source . . . atmosphere generators providing all gas variations required . . . and auxiliary equipment to speed and simplify work handling.

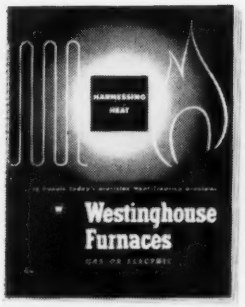
Specialized Engineers and Facilities Work for You

Westinghouse offers a unique and comprehensive service that extends ideas, know-how and capacity to solve heat-treating problems. At any stage of planning or production, Westinghouse engineers can be called to your plant for sound, unbiased recommendations that will help you get more from heat-treating operations. Skilled designers, packaged installation techniques (even to complete erection and installation where needed) and maintenance follow-through, combine with this engineering staff to form a dependable service that is unmatched in the heat-treating field.

Use coupon below for your free 40-page book on the complete line of Westinghouse furnaces and equipment. For further information write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-10433

YOU CAN BE SURE...IF IT'S

Westinghouse



Westinghouse Electric Corporation
3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania
Please send free copy of B-5459 to:

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YOU'LL DO A BETTER JOB

with **H. V. ADAMS DESIGNED**

HIGH EFFICIENCY FOUNDRY TOOLS

"UNIVERSAL FREE WHEELING"

FOUNDRY SAND RIDDLE

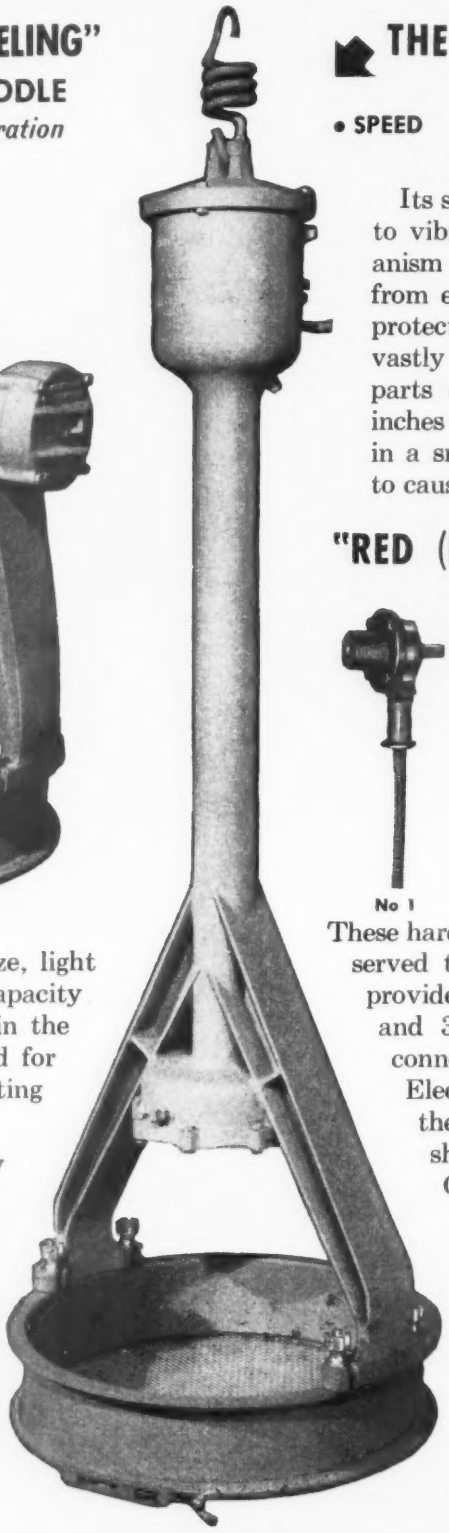
with the Double Eight Vibration

Because of its convenient size, light weight and good riddling capacity it long has been a favorite in the foundry. It also can be used for mixing core sand or for sifting sand directly into molds.

The mechanism is entirely enclosed protecting it from harmful dust and grit.

The main frame is cast in very strong tough aluminum.

It uses quick change ferruled sieves with 20 in. diameter sifting area. There are no loose wires to harm hands.



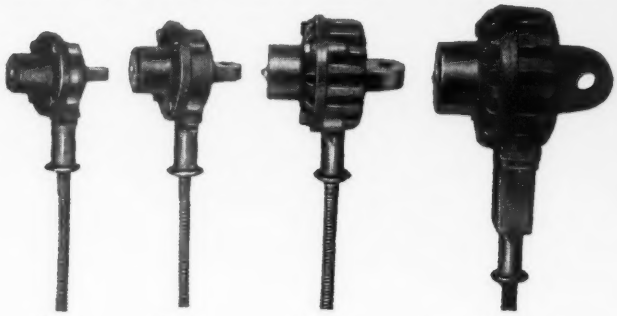
THE "ROTOPLANE" SPEED SIFTER

WILL GIVE YOU

- **SPEED**
- **ECONOMY**
- **SAFETY**
- **LONGER LIFE**
- **GREATER SIFTING CAPACITY**

Its sturdy one-piece frame and long shaft add to vibration effectiveness. The sealed-in mechanism assures protection of motor and bearings from exposure to dust and grit. This sealed in protection and "Rotoplane's" free-rotary action vastly increase bearing life. No exposed moving parts endanger the operator. Sieves have 20 inches diameter clear sifting area — are mounted in a smooth steel ferrule with no jagged edges to cause dangerous cuts and scratches.

"RED (Devil) ELECTRIC" VIBRATORS



No 1 No. 2 No. 5 No. 9

These hard hitting Adams designed Vibrators have served the foundries for over 30 years. They are provided with a 6 foot 3 wire authorized cable and 3 wire grounded connector which, when connected with our 3 wire grounded Red Electric Knee Switch, automatically grounds the vibrator protecting the worker from shock. The vibrators have passed the U. S. Government code inspection.

Other Foundry Products:

- **No. 11 NOISELESS TYPE VIBRATOR**
- **A-20 ELECTRIC VIBRATOR**
- **RED ELECTRIC KNEE SWITCHES**
- **"ROTO" ADJUSTABLE BIN VIBRATOR**
- **2 MIN. UNIVERSAL FINENESS TEST SIFTER.**
- **UNIVERSAL TRIPOD CARRIER**

ORDER ALL SIFTERS AND VIBRATORS WITH GROUND WIRE!!

FOUNDRY SUPPLIES MANUFACTURING CO., NOT INC.

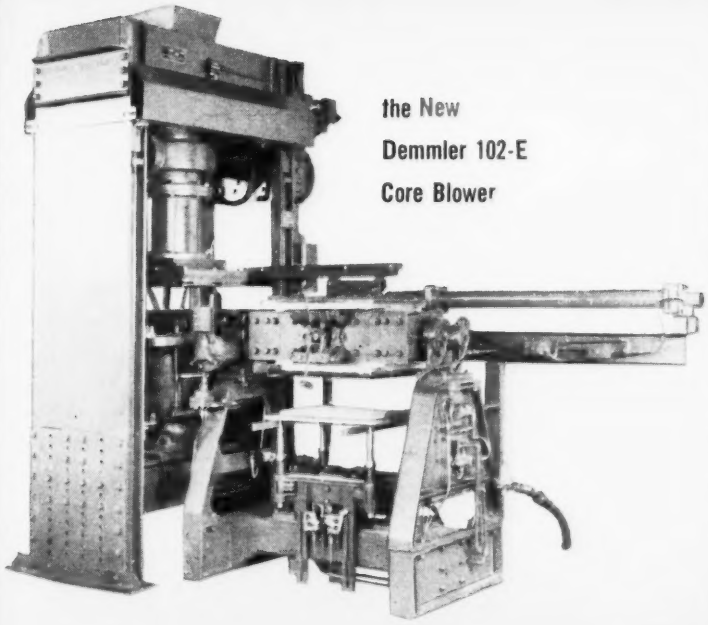
2221 Orchard Street - Chicago 14, Illinois

Established 1918 **Cable Address: "Rotoplane Chicago"** **H. V. ADAMS, Mgr.**

High Core production's fine

BUT

how about Maintenance?*



the New
Demmler 102-E
Core Blower

* High production can cost money if followed by long hours of down-time. With the trend to automation in the foundry industry, down-time becomes more of a production hazard. Core blowers must offer high production AND low maintenance. Demmler core blowers hold the record for both!

Shown below is the Demmler 102-E Stationary Sand Magazine, Fully Automatic Core Blower. It has the No. 6 Demmler double core-roll-over draw machine and core box shuttle. This NEW production pacer will blow, draw, roll-over and draw cores at a production rate up to 360 per hour with one man operation!

And, for low maintenance, look at these figures kept by a Midwest foundry on all their core blowers. In a two year test Demmler machines were lowest of FOUR Types!

A CASE HISTORY

Maintenance Cost on Core Blowers

1952-1953

	Labor	Mat.	Total
Demmler Core Blower	$ 81.85	$ 44.80	$ 126.65
Core Blower "A"	85.47	141.18	226.65
Core Blower "B"	104.56	237.24	341.80
Core Blower "C"	288.07	433.33	721.40

1953-1954

	Labor	Mat.	Total
Demmler Core Blower	$ 18.08	$ 24.89	$ 42.97
Core Blower "A"	33.28	148.84	182.12
Core Blower "B"	124.45	121.35	245.80
Core Blower "C"	149.24	228.24	377.48

Highest production and lowest maintenance

DEMMLER CORE BLOWERS

KEWANEE, ILLINOIS MANUFACTURED BY WM. DEMMLER & BROS.

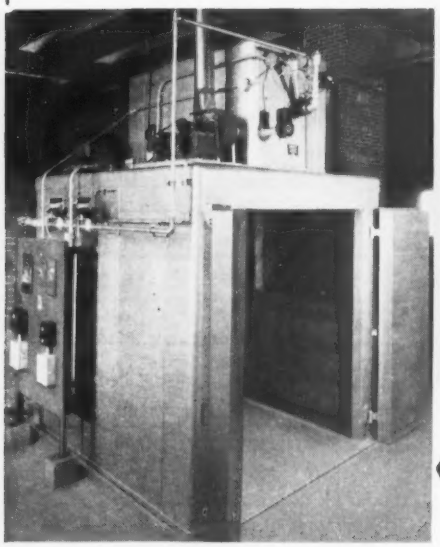
IS THE HEAVY HAND of OBSOLESCENCE

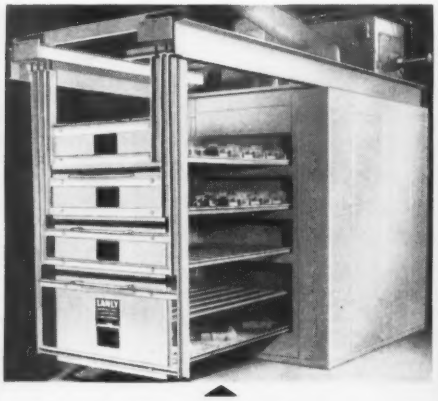
Retarding Your Production

OLD STYLE, INEFFICIENT CORE OVENS

with antiquated hand firing and charging methods can add appreciably to your operating costs.

Then too, there is the problem of a high percentage of rejects in old oven production. Can you afford this?





1. Drawer Type Oven

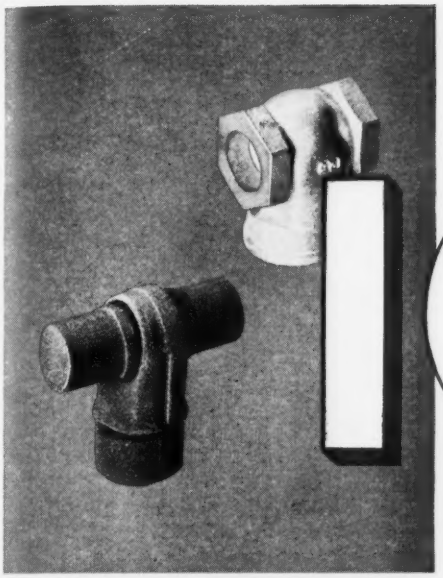
2. Single Compartment Rack Type Oven

3. Car Type Oven

Isn't this an opportune time to examine closely the oven facilities of your foundry for a possible improvement? The average foundry requirements can be met with standard LANLY units. Custom designed units for core baking, pasting and mold drying are part of LANLY'S services, as well as ovens for casting conditioning and heat treating.

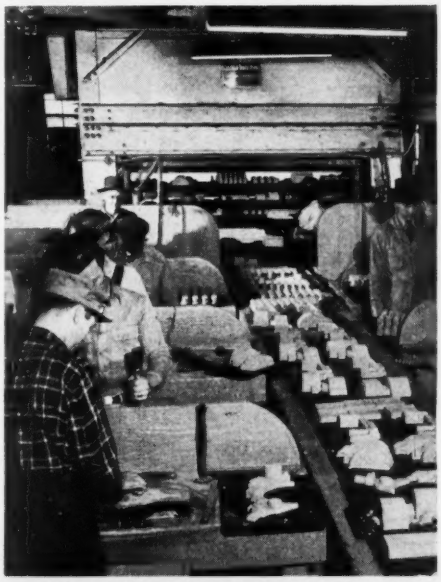
WRITE FOR THE LATEST CATALOG AND FACTS ON ANY INSTALLATION

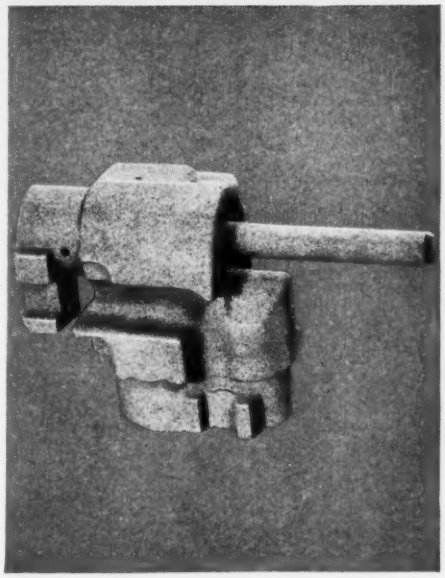
LANLY
FOUNDRY OVENS
THE LANLY COMPANY • 780 PROSPECT AVE
CLEVELAND, OHIO



10 reasons

for switching to BORDEN'S resin core binders





1 **Lower over-all core costs**

2 **Faster baking—increased oven capacity, lower fuel costs, lower dryer investment**

3 **Better core physicals—stronger, harder cores**

4 **Smoother cored surfaces**

5 **No volatiles to gum up oven interiors and contaminate working area**

6 **Less smoke—better working conditions**

7 **Controlled collapsibility**

8 **Easier shake-out**

9 **100% cure — minimum oven time**

10 **Cured core is moisture-resistant—won't draw dampness**

Thor plastic core binders save time and money, produce better cores, smoother castings. An experienced Borden technical representative will be glad to work with you in your foundry. He'll help you develop the most efficient and economical formulas for your particular operations. For more facts, write: The Borden Company, Chemical Division, Dept. F-15, 350 Madison Avenue, New York 17, N. Y.

THOR FOUNDRY PRODUCTS

THE *Borden* COMPANY
CHEMICAL DIVISION

Urea and Phenolic Resin Core Binders . Shell-Mold Resins . Core Spray . Core Paste . Parting Agents

It goes with-

HINES
POP-OFF
FLASK
MEMBER
FEMA
HINES
POP-OFF
If you're not fully acquainted with the advantages of HINES POP-OFF FLASKS, please write us for complete information.

out saying...

but-

we're saying it again...

the HINES flask co.

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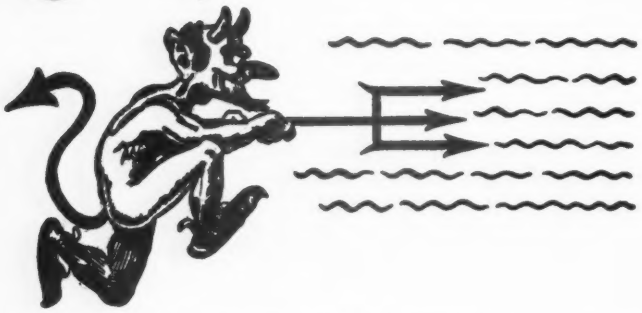
Soffel's



FLUXES and EXOTHERMIC COMPOUNDS

for all

Metals and Alloys

THERMOTOMIC "X" COMPOUND is an exothermic material which is molded and baked into necked down riser cores and inserts. It produces a temperature of 3500° F. and is used as ring inserts under the risers or feeding heads. Great savings are realized through reduced riser dimensions and cleaning costs. In conjunction with Thermotomic Compounds, Carbon Free Liquidizer No. 5 should be used on top of the metal in the heads.

THERMOTOMIC ABC—For aluminum and magnesium castings, necked down riser cores and inserts—prevents piping and shrinkage into castings. Soffel's ALX-31 Liquidizer should be used on top of the metals in the head.

THERMOTOMIC HoTop LIQUIDIZER — For short risers—saves 60 to 70% of feeding metal in the heads.

EXOTHERMIC CARBON FREE LIQUIDIZER—A feeding head compound for castings and ingots of ferrous and non-ferrous metals — saves metal and prevents piping and shrinkage.

CARBON FREE LIQUIDIZER AL-X31—For aluminum and magnesium feeding heads—prevents piping.

EXOTHERMIC INSULATING SLEEVE CORE COMPOUND—For riser sleeves—adds heat and prolongs fluidity of feeding metal in heads or risers.

DENSILTITE LADLE FLUX—For iron and semi-steel—reduces sulfur and phosphorus. Adds fluidity and temperature in pouring ladles—produces clean iron.

SOFFEL'S NON-FERROUS FLUXES

BB-2—For red brass, nickel and tin bronze pressure castings—removes sulfur, iron, phosphorous oxides and gas from brass and bronze.

SUPER BRASS FLUX—For brass and bronze—prevents oxidation of zinc.

BRASS REFINING FLUX—For cupola melting and open flame furnaces — prevents oxidation. Produces liquid slag and faster melting.

COVERALL BRASS FLUX—Removes gas and oxides from yellow brass and nickel silver.

RADIOCLARITE BRASS FLUX—For open flame furnace melting—increases fluidity, tensile strength, removes gas, oxides and iron.

AB-6 BRASS FLUX—For electric furnace melting of brass and aluminum bronze—keeps furnace linings clean.

KLEEN-ALL BRASS CLEANER—For use in bottom of pouring ladles or open flame furnaces to absorb liquid slag and keep the furnace and ladle linings clean.

BRASS ALUMINUM REMOVER — Removes all traces of aluminum from copper, brass or bronze.

HI-LED BRONZE FLUX—Holds lead up to 50% in copper without use of nickel.

NICKEL MONEL FLUX — Removes gas and adds fluidity to metal.

ALUMINUM BRONZE FLUX—A perfect deoxidizer for reducing aluminum and iron oxide in manganese bronze and aluminum bronze. Adds fluidity.

COPPERTITE FLUX—For high conductivity castings—removes cuprous and cupric oxides and gas from copper.

FERRO-OUT IRON REMOVER—Removes free iron or alloyed iron from brass, bronze or copper.

SOFFELITE ALUMINUM FLUX—Removes aluminum oxide and iron from aluminum and increases the fluidity and tensile strength.

MAGNALUM FLUX—For magnesium and aluminum alloys—removes gas and oxide and increases fluidity.

KLEN ZINC FLUX—A deoxidizer and purifier for zinc base pressure die castings—removes gas, sulfur and iron.

DIE COATING—For pressure zinc base die castings—will not scale, blister or create gas in the molds.

PERMANENT MOLD COATING—For aluminum and magnesium castings — adds longer life to molds. Produces clean gas free castings.

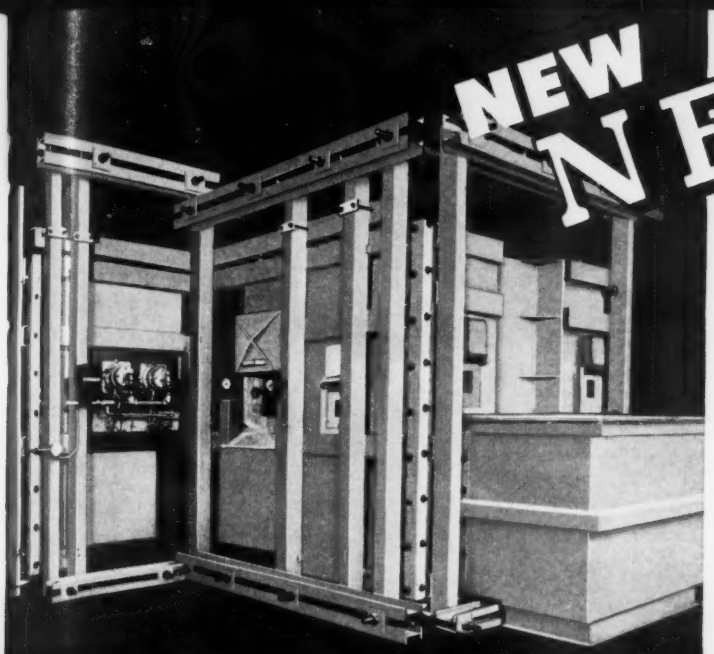
POT COATING—For iron pot melting — increases life of pots. Prevents iron pick up.

U. S. Patents No. 2,490,327 and No. 2,500,097

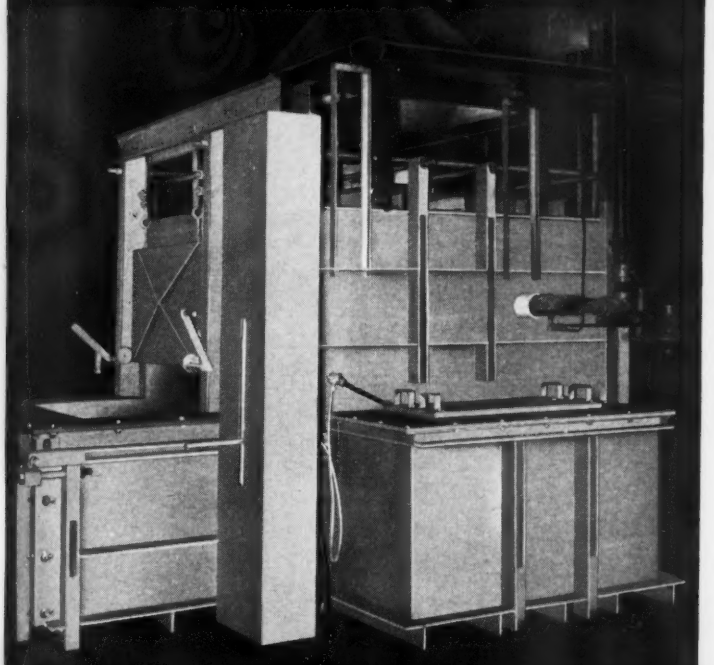
PITTSBURGH METALS PURIFYING COMPANY

World's Largest Manufacturer of Fluxes and Purifiers For All Metals and Alloys

1352 MARVISTA ST., N. S. PITTSBURGH 12, PA.



Made for 120,000 lbs. Zinc



Made for 16,000 lbs. Zinc

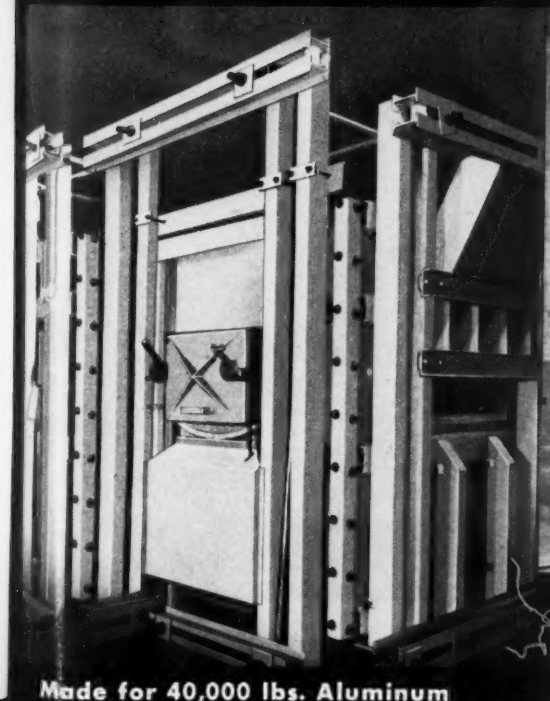
NEW NEW NEW!

STROMAN NOW OFFERS A COMPLETE LINE OF REVERBERATORY FURNACES FOR THE MELTING OF . . .

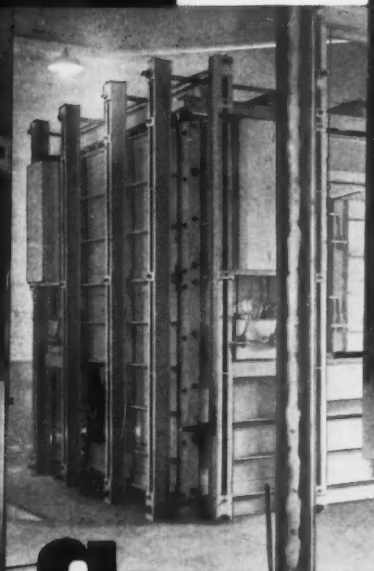
ALUMINUM, ZINC, BRASS

Capacities are unlimited

These reverbs are built to assure heavy duty production for Smelting, Extrusion work, Die Casting, Permanent Molding and Foundry melting. Now in operation in some of the most prominent plants in the country they have proved their ability to deliver great volumes of metal that results in perfect castings, every time. They are easy to work with and around . . . operate most economically and are easy to maintain. Their efficiency and economy will amaze you and convince you of their superiority to any other furnace available. Why not write to-day for full information.



Made for 40,000 lbs. Aluminum



Made for 25,000 lbs. Aluminum

STROMAN FURNACE & ENGINEERING CO.
DIVISION OF
THE PETERSEN OVEN CO., FRANKLIN PARK, ILL.

THE IDEAL METHOD:

INDUCTION MELTING

with converter-operated furnaces...

Wherever metals are heated or melted in small quantities . . . for steel, non-ferrous or precious metal casting, sintering or hot pressing carbides, brazing . . . these self-tuning, low cost converter-operated furnaces are virtually standard equipment.

Ajax-Northrup converters are certified to meet F. C. C. regulations. Furnaces are available in sizes from 2 ozs. to 120 lbs. (For large production—Ajax-Northrup generator-operated furnaces.)

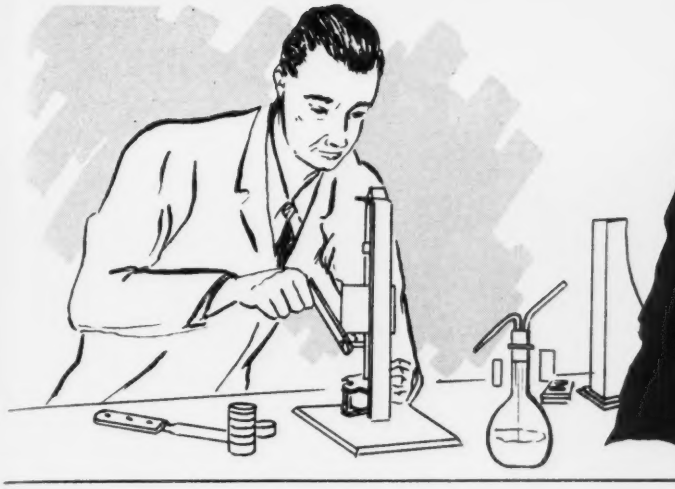
Write for Bulletin 14.

AJAX NORTHRUP SINCE 1916

INDUCTION HEATING-MELTING

AJAX ELECTROTHERMIC CORPORATION • TRENTON 5, NEW JERSEY

ASSOCIATED COMPANIES: AJAX ELECTRIC FURNACE CORPORATION • AJAX ELECTRIC COMPANY • AJAX ENGINEERING CORPORATION



FOR EASIER...BETTER SAND CONTROL USE

DELTA

SCIENTIFICALLY DEVELOPED FOUNDRY PRODUCTS

DELTA PERMI-BOND

SEA COAL REPLACEMENT IN MOLDING SAND

DELTA PERMI-BOND is a revolutionary development which eliminates the use of SEA COAL . . . and its inherent disadvantages . . . in molding sands.

It is a specially prepared pure hydrocarbon, completely volatile at elevated temperatures. It decomposes to form a vapor-gas cushion, which is reducing in nature, and leaves only a trace (two-tenths of 1% maximum) of ash.

NOTE THESE IMPORTANT ADVANTAGES . . . 1. Always uniform. 2. Eliminates sand contamination. 3. Greatly reduces gas, smoke, soot and dirt in the foundry. 4. Provides correct amount of vapor gas in the mold cavity to prevent casting blows. Allows use of lower permeability sand. 5. Increases dry strength of sand 75% to 90%. 6. Prevents scabbing, buckling, rat-tailing and cutting which greatly reduces scrap castings. 7. Improves casting finish, cuts cleaning room costs to a minimum. 8. More economical to use; reduces your sand costs. 9. Much cleaner and more foolproof to use than sea coal.

DELTA DRI-BOND

IN CORE SAND

DELTA DRI-BOND BINDER is a product of several years of research and experimentation in our own sand research laboratory and proved by additional years of actual experience-in-use data compiled by prominent foundries. The excellent results obtained with Delta Dri-Bond Binder, reported by all sources, establish beyond question both the outstanding superiority and greater economy of this new product for use in steel, gray iron and non-ferrous foundries.

In recent tests, conducted by impartial personnel, it was definitely proved that Delta Dri-Bond Binder has (a) — higher tensile and compression strength, (b) — much greater waterproofing properties and (c) — considerably higher green strength and hot strength than other dry binders tested.

DELTA SAND CONDITIONING OILS

FOR CORE AND MOLDING SANDS

DELTA SAND CONDITIONING OIL is a very fluid organic liquid with a light greenish color cast. It has a very low surface tension and acts as a lubricant in sand mixes. It improves the flowability and workability of both molding and core sand mixes. Its greatest use is in core sand mixes where, in addition to improving the flowability of the sand, it helps eliminate sand sticking to the core boxes.

It has proven exceptionally useful in the elimination of core sand sticking problems in plastic resin core sand mixes.

DELTA

Get the Facts . . . Working samples and complete literature on Delta Foundry Products will be sent to you on request for test purposes in your own foundry.

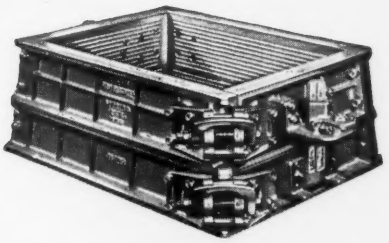
DELTA OIL PRODUCTS CO.

MANUFACTURERS OF SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS

MILWAUKEE 9, WISCONSIN

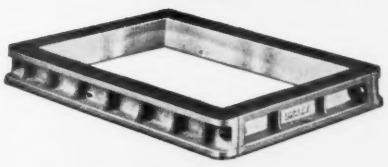
ADAMS Universal Jolt Squeezers will *MINIMIZE* your Rejects

Simple design for reduction of production costs . . . that's what Adams has achieved in their Universal Jolt Squeezer. Used either as a jolt squeeze pattern draw machine, or as a plain jolt squeezer, the operation of these units is so simple that high levels of production can be easily maintained. Available both in post and side rod types, stationary or portable.



Adams custom-built flask equipment

Made by experienced craftsmen, to your exact specifications. Adams aluminum flask equipment gives you superior performance through convenience and economy. Look to Adams Aluminum Easy-off Flasks, Aluminum Upsets and Aluminum Jackets for the finest.



Write for further free information.

The ADAMS Company

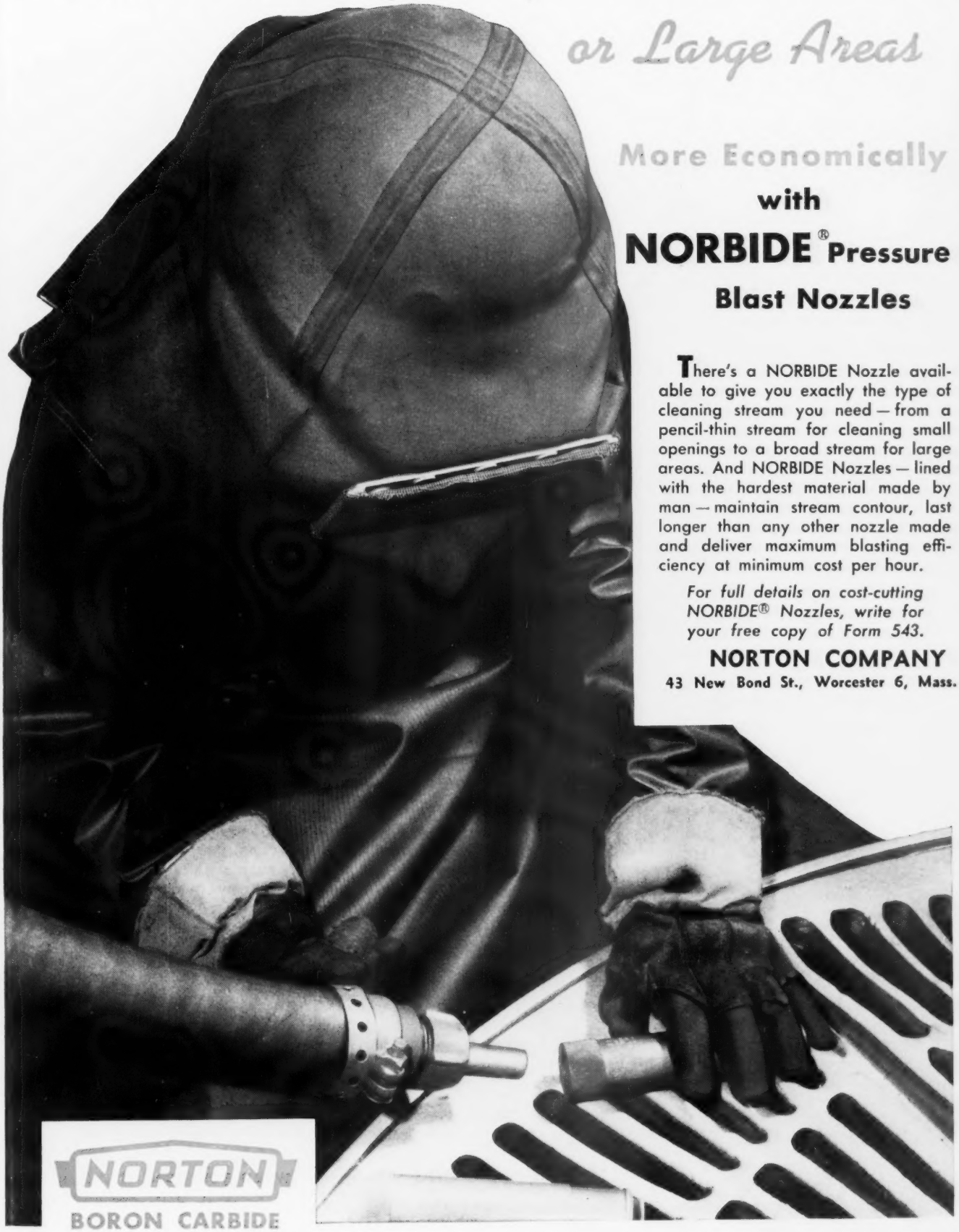
ESTABLISHED 1883

MOLDING MACHINES and FLASK EQUIPMENT

700 Foster Street, Dubuque, Iowa, U.S.A.

Clean Small Openings Like This . . .

or Large Areas



More Economically with NORBIDE® Pressure Blast Nozzles

There's a NORBIDE Nozzle available to give you exactly the type of cleaning stream you need — from a pencil-thin stream for cleaning small openings to a broad stream for large areas. And NORBIDE Nozzles — lined with the hardest material made by man — maintain stream contour, last longer than any other nozzle made and deliver maximum blasting efficiency at minimum cost per hour.

For full details on cost-cutting NORBIDE® Nozzles, write for your free copy of Form 543.

NORTON COMPANY
43 New Bond St., Worcester 6, Mass.

NORTON
BORON CARBIDE

NORBIDE® . . . *The Longest Nozzle Life you can buy*

C. J. Becker's CONFIDENCE IN SIMPSON PAYS

● They haven't bought a new mixer at Union Brass & Mfg. Company since the late 30's . . . but Vice President C. J. Becker's satisfaction and confidence in the performance of their two Simpson Mix-Mullers helped this leading St. Paul, Minnesota foundry boost their production on household and commercial plumbing fixtures by 20%.

Purchased in 1938, Union's first Mix-Muller was used for facing sand until 1953. In 16 years they have replaced *one* reducer. Repairs have been minor and the original mullers are just now beginning to show signs of wear. It was satisfaction with this machine and confidence in the National people who sold it, serviced it, and discussed foundry matters with Mr. Becker that brought about the NATIONAL designed and built mechanized shop shown at right. With it, production is up 20% . . . their all-mulled sand has brought about definite improvements in casting quality and lower rejects. Improved working conditions have paid off in safety, high morale and expedient service to customers.

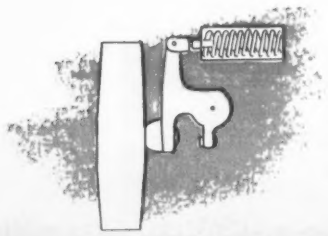
The Union Brass story is typical of the type of confidence on which National Engineering Company service is based.

YOUR NATIONAL AGENT . . . a single source for foundry planning

Your "man from National" is more than a mixer salesman. He's backed by over 40 years of practical design, engineering and operating foundry experience. The service which he represents touches every phase of foundry practice. The benefit of his experience and his company's experience in engineering, in sand practice, in sand and mold handling, design and erection . . . is a valuable asset to your future planning.

MORE AND BETTER SAND FOR EVERY DOLLAR INVESTED

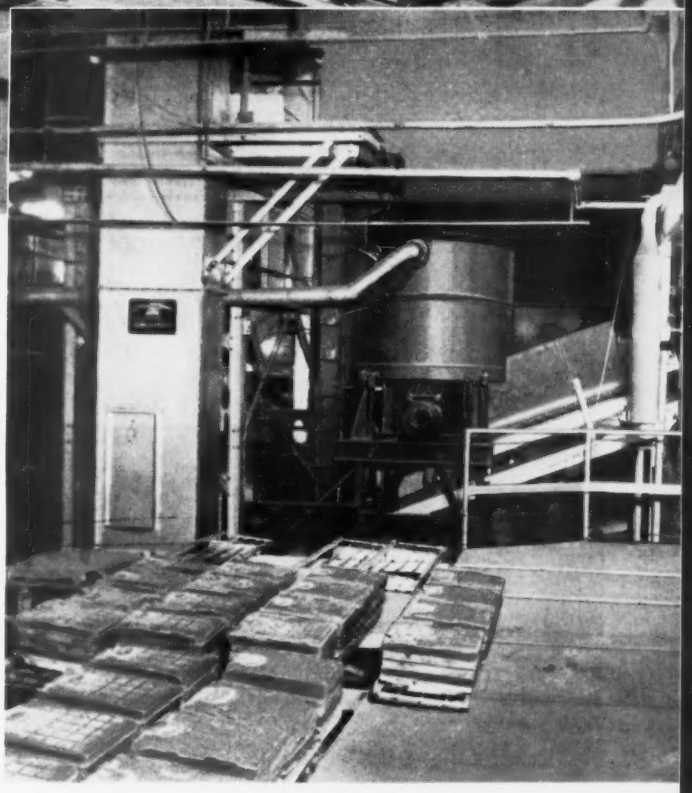
The new F Series Mix-Mullers are now available in batch capacities designed for every foundry requirement. Based on the simple, rugged and dependable bottom discharge principle where all power is used to mull, the Simpson Mix-Muller assures low maintenance, longer life and incorporates many new features designed to make mulling easier . . . sand control more positive.



MAXIMUM MULLING where and when you need it

Designed to transmit variable muller pressure to the sand bed through mullers of comparatively light initial weight, spring-loaded mullers permit maximum muller pressures to build up—as the sand increases in strength during mulling. This is your assurance of positive control over mixes from the slickest core sands to the toughest steel sands . . . at the turn of a wrench.

YS 20% PRODUCTION DIVIDEND FOR UNION BRASS



SPECIAL INCLINED PALLETS SERVE UNION BRASS

Uniform metal shrinkage, ease of pouring and no manual handling of molds is assured by this National engineered inclined pallet system. Semi-automatic weights permit positioning of individual weights on multiple mold pallets. One man shifts all molds and sets weights . . . one man handles shakeout. Overhead storage at molders stations, batch hoppers, conveyors and elevators handle all sand mechanically.

STEADY FLOW OF ALL-MULLED SAND FROM THIS SYSTEM

New mechanized system at Union Brass eliminates facing and floor heaps. Sixteen-year-old Simpson Mix-Muller delivers top quality sand for 40-43 molds per man per hour on two shifts daily.

National Engineering Company
(Not Inc.)
646 Machinery Hall Bldg. • Chicago 6, Illinois

PRODUCTS OF A PRACTICAL FOUNDRYMAN

LESS MAN-HOURS PER TON WITH TRULINE®-BONDED CORES

In the core room, in the molds, and in the cleaning room, foundries get more efficient operations, reduced man-hours per ton with Truline Binder.

IN THE CORE ROOM—Truline means a quick bake, no oven bottlenecks.

IN THE MOLDS—Truline means strong cores, elimination of breakage. And Truline is moisture resistant.

IN THE CLEANING ROOM—Truline's collapsibility means cores are easily removed by knockout or hydroblast. Man-hours are reduced, casting repairs and welding costs minimized.

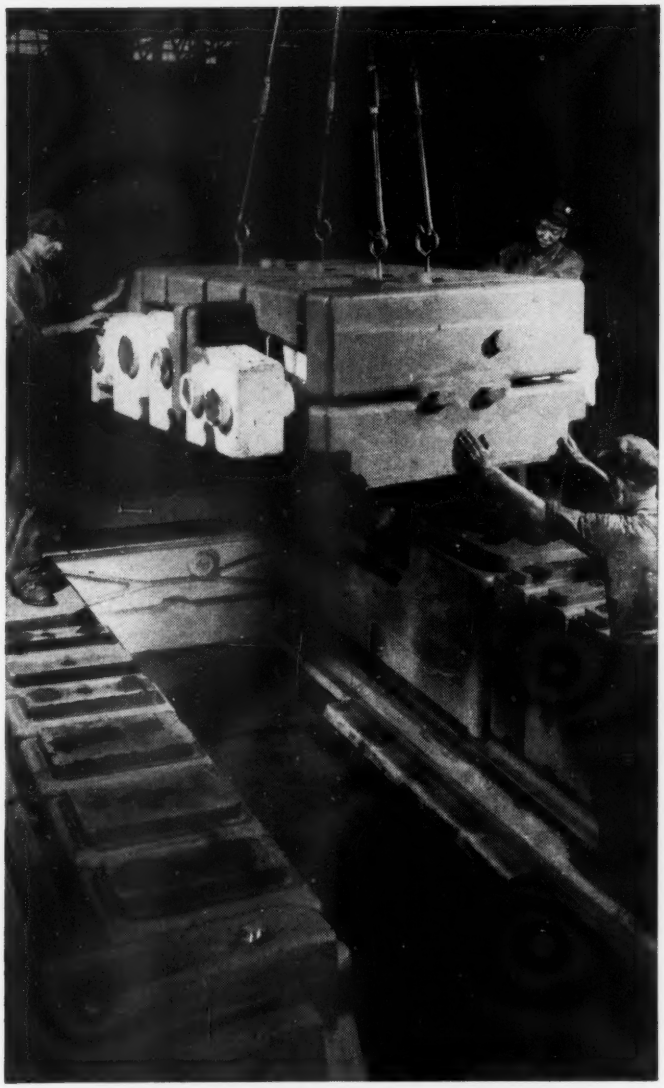
Your Truline Binder serviceman will be glad to discuss the many advantages of Truline with you. Or write:

Naval Stores Department

HERCULES POWDER COMPANY

INCORPORATED

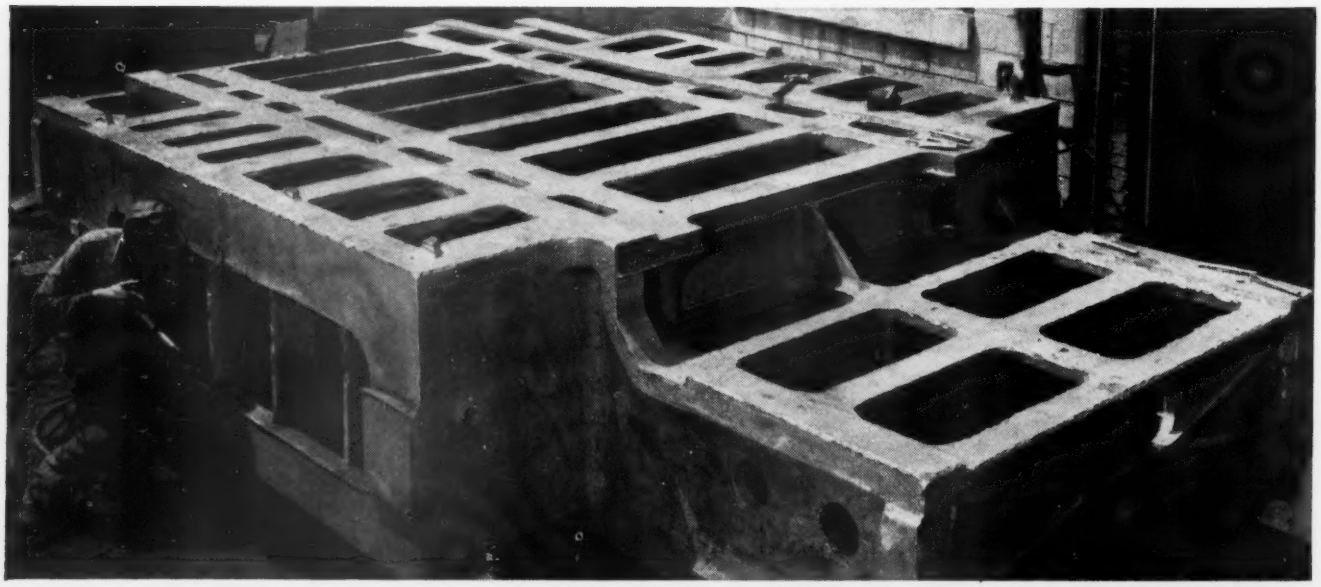
920 King Street, Wilmington 99, Del.



(PHOTOS COURTESY ELYRIA FOUNDRY CO.)

IN THE CORE ROOM—Coring large molds such as this can be done more quickly, more efficiently when fast-baking Truline Binder is used.

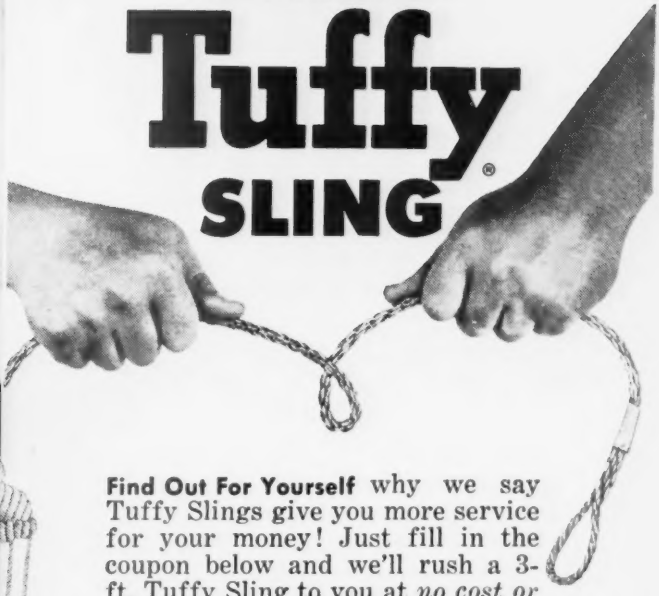
IN THE CLEANING ROOM—Preparing this twenty-six ton iron casting for shipping can be done in a minimum of time due to the crack-free, semi-finished casting produced from Truline-bonded cores.



NF55-1

TEST IT TO DESTRUCTION IF YOU CAN!

FREE Tuffy® SLING



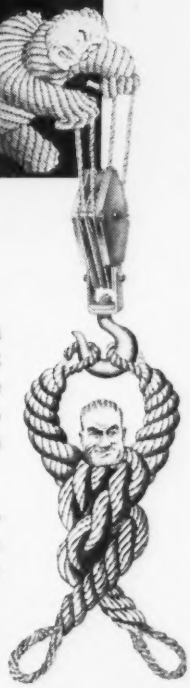
Find Out For Yourself why we say Tuffy Slings give you more service for your money! Just fill in the coupon below and we'll rush a 3-ft. Tuffy Sling to you at *no cost or obligation.*

Then Prove Tuffy's Toughness with any test you want to make! Loop it, knot it, kink it, jerk it—we won't be worried, even if you test your free Tuffy Sling on weights up to *twice* the rated working load!

You'll Find The Exclusive, patented braided-wire fabric construction takes strains and jolts that soon snap ordinary rope slings! It's the unique machine braided, 9-part construction that helps your Tuffy Sling resist kinking—and if you *can* kink it, you straighten it out in minutes *without material damage!*

Get Your Free Tuffy Sling and discover why more and more people are switching to Tuffy every year!

Tuffy® HOIST LINE



The Hoist Line That Matches Tuffy Slings in strength and wearability—that's *Tuffy* Hoist Line! Absorbs load shocks smoothly, because it's designed *only* for hoisting . . . passes safety checks weeks after ordinary ropes would have been thrown away!

Ordering Is Easy! No complicated specifications—just state length, diameter and the name, "Tuffy Hoist Line." Reeve your crane with Tuffy and see the difference!

Your Tuffy Distributor Will Help You Keep Your Inventory Down!

He's Happy To Stock Ahead of your needs . . . wants to work closely with you to assure the best possible service. Just give him a rough idea of your future requirements and backed up by his nearby Union Wire Mill depot, he will keep a full stock to draw on against your needs. Get together with him—*soon.*

union Wire Rope corp.

Specialists in High Carbon Wire, Wire Rope and Braided Wire Fabric

TEAR OFF AND MAIL COUPON *NOW!*

Union Wire Rope Corporation
2280 Manchester Ave., Kansas City 26, Mo.

At no cost or obligation to me, please rush the material I have checked:

- ☐ FREE 3-Ft. Tuffy Sling!
- ☐ FREE Sling Handbook and Rigger's Manual, Featuring 12 Tuffy Factory-Fitted Types!
- ☐ Name and Address of Tuffy Distributor Nearest Me!

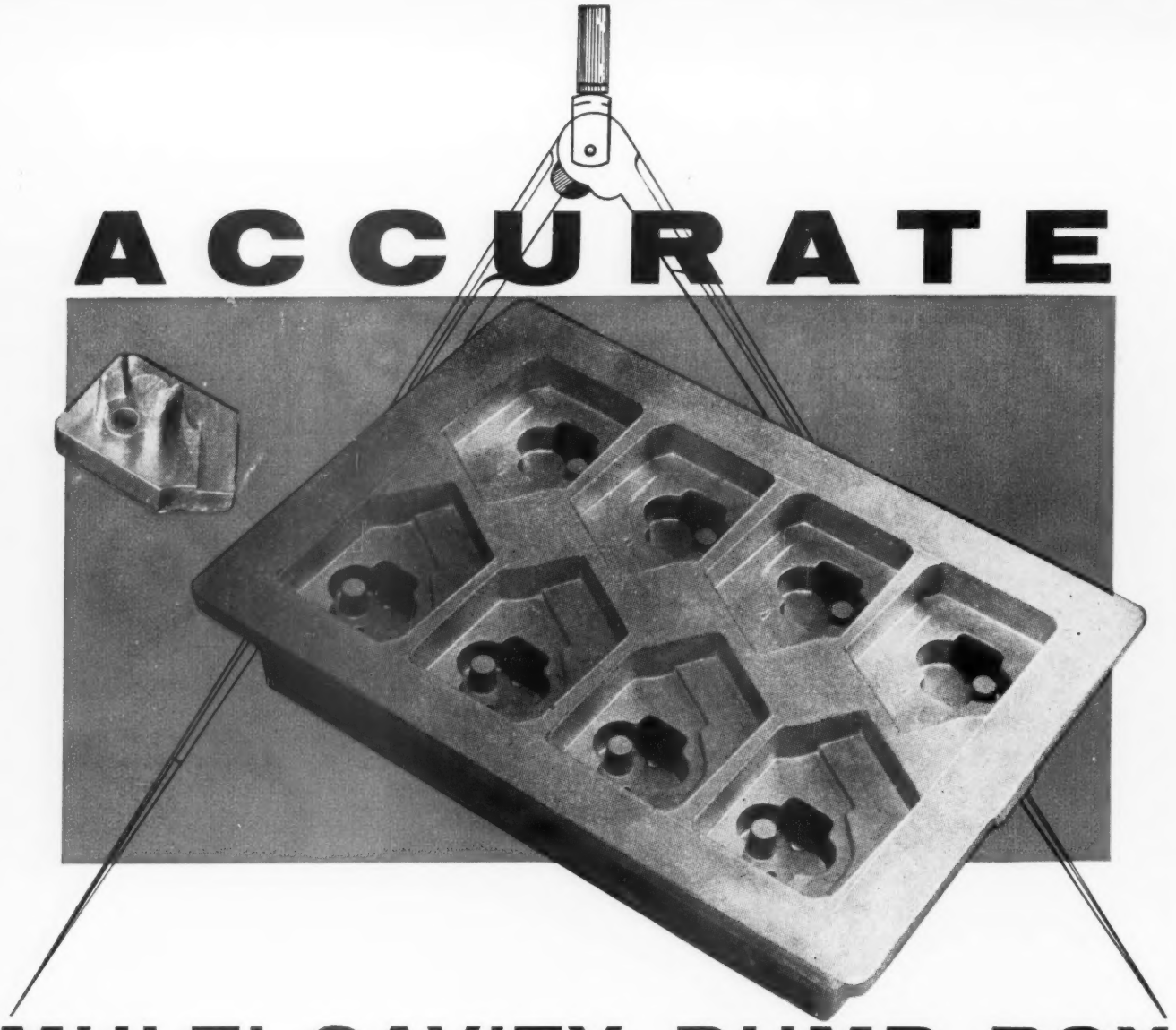
FIRM NAME_____

BY_____ TITLE_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

ACCURATE



MULTI-CAVITY DUMP BOX

UNIFORM IMPRESSIONS...LOWER COST

The 8 gang dump box shown in this unretouched photograph was made from the single wood master core plug and backing frame. The same method may be used for two part split or booked type core boxes with flat or irregular partings. Added savings plus greater accuracy are assured when properly cleared white metal or aluminum master dryer patterns are also made by this same process.

There is real profit in this idea for you. Hundreds of foundries are now using this modern streamlined method of making core boxes and master dryer patterns because it is accurate, saves machining and offers large savings in the more intricate and gang type core boxes.

QUICK DELIVERY

By Air Freight, Parcel Post, Special Delivery or Railway Express. Pick-up and delivery by jobber representatives in the following areas . . .

AUBURN, MASS.
Henry A. Kottmann
Telephone: Auburn 2683

MILWAUKEE, WIS.
John M. Donohue
Telephone: Hilltop 2-7130

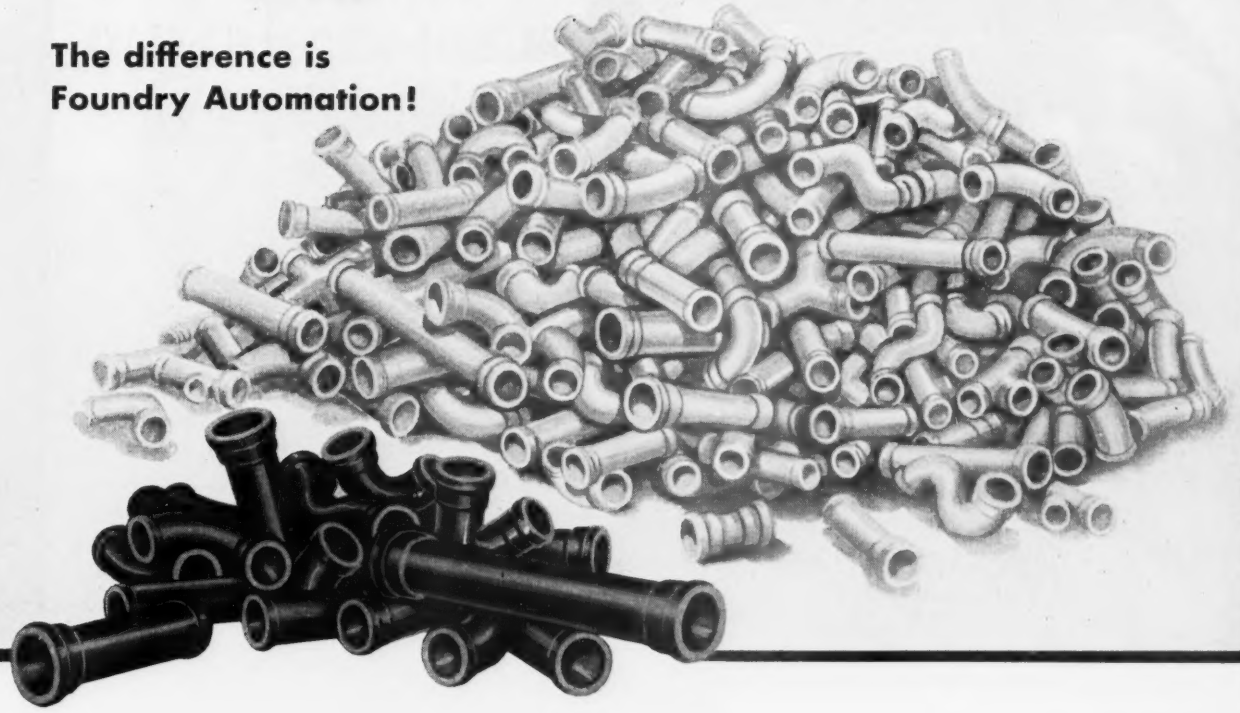
LOS ANGELES, CALIF.
McGowan Company, Inc.
Telephone: Trinity 2057

Write for Catalog

ACCURATE MATCH PLATE COMPANY
1849 WEST CARROLL AVENUE • Telephone: SEeley 3-7918 • CHICAGO 12, ILLINOIS

20 or 120 PIPE PER MAN PER DAY

The difference is Foundry Automation!



AUTOMATION

for high production, low cost soil pipe

THROUGH AUTOMATION, the Foundry Industry has made significant advances. Lower unit cost, higher production per man, and improved casting quality are among the many reasons foundries are turning to Automation. They are finding that with a well-engineered, mechanized foundry they can strengthen their competitive position, expand existing markets, and open new ones.

GIFFELS & VALLET Inc., long active in the field of Automation, maintains a Foundry Department with a large staff of engineers and technicians. These specialists are experienced in planning complete automated foundries. The interesting story of this comprehensive service is discussed in a special Foundry brochure. A copy will be mailed upon request.

Engineers and Architects serving Industry for over 30 Years

See What They Say about Giffels and Vallet

NEW YORK
CHICAGO
HOUSTON
WINDSOR, ONT.

INDUSTRIAL ENGINEERING DIVISION

Giffels & Vallet

DETROIT, MICHIGAN

Fremont MAGNESIUM FLASKS

The Way to

MORE EXACTING WORK

Accurately machined inside surfaces and flanges. Steel faced top and bottom flanges.

LONGER SERVICE

Magnesium has twice the tensile strength of aluminum.

EASIER HANDLING

Magnesium weighs 1/3 less than aluminum.

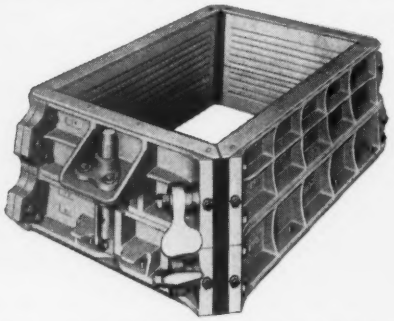
All orders given prompt attention. Write today for literature.

THE FREMONT FLASK CO.

FREMONT, OHIO

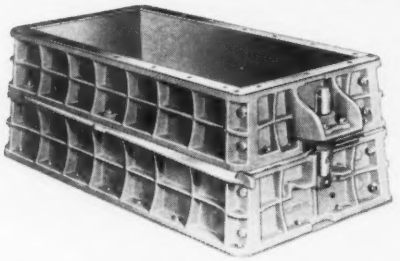
The New

FREMONT SPREADLOCK FLASK



Long-life, easily replaceable, live rubber corner inserts completely close the corner gaps so that no sand can lodge in the open corners.

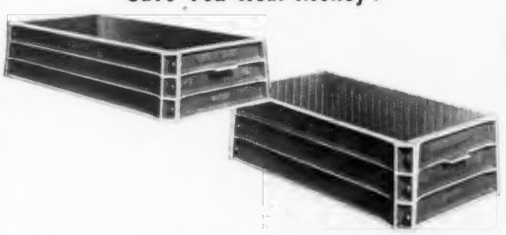
FREMONT STANDARD SLIP FLASK



The one-inch **GROOV-LOCK FOOLPROOF PIN**, particularly adapted to cope or drag pattern jobs, guarantees perfect alignment indefinitely. (Other types of standard pin fittings available.) Solid, bolted and welded corner construction.

FREMONT CAST IRON OR CAST ALUMINUM JACKETS

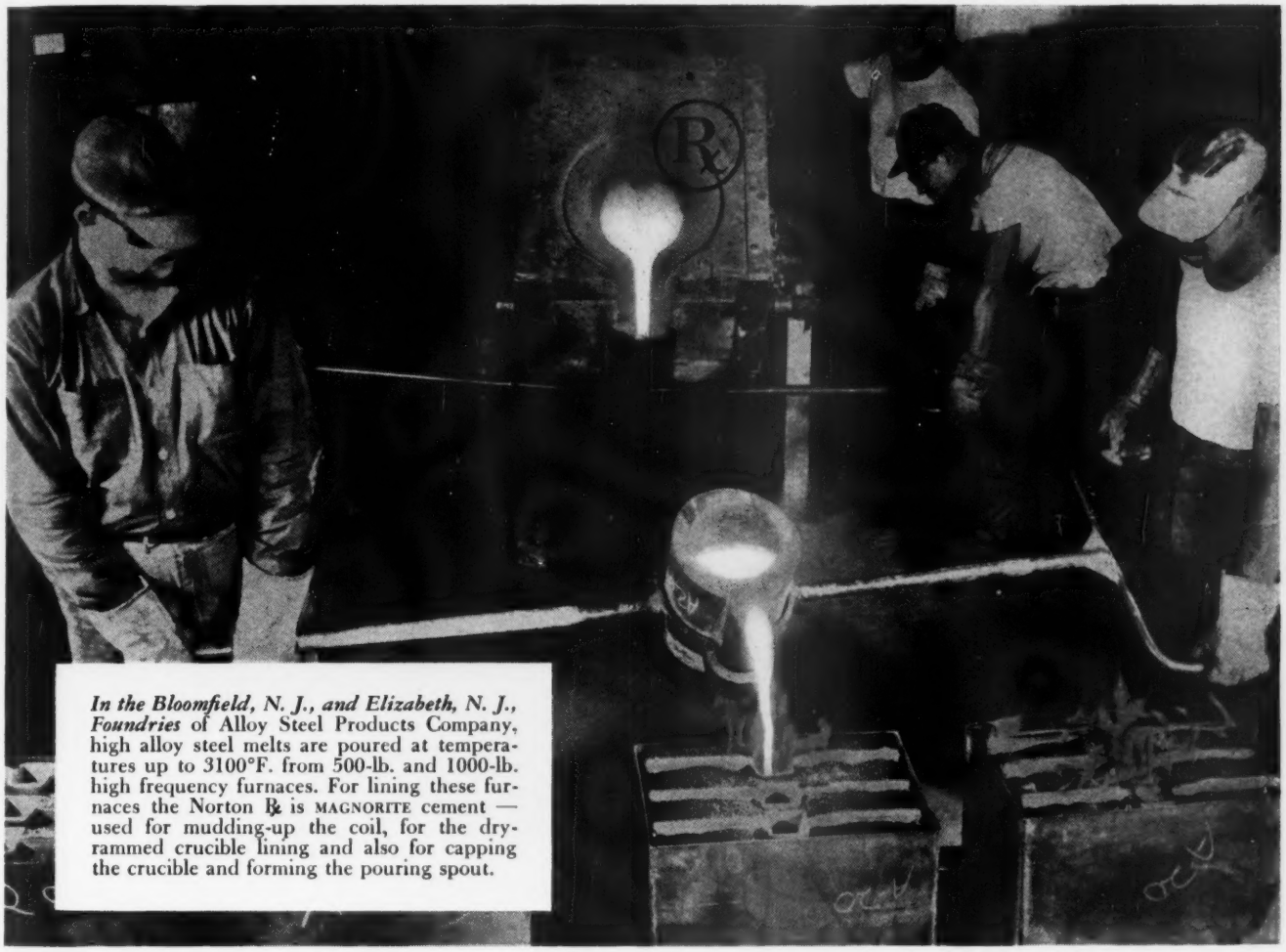
Save You Real Money!



Precision machined and drilled, bolted corner construction permits easy insertion of new sides or ends. The entire jacket need not be scrapped. Standard style for ordinary foundry practice. Grooved style, which permits ready gas escape, for steel foundries. Glass and jackets can be assembled on 3°, 4°, or 5° taper.

Another Norton Rx *on the job!*

*Makers of famous Aloyco Valves, after testing many cements, standardize on MAGNORITE**



In the Bloomfield, N. J., and Elizabeth, N. J., Foundries of Alloy Steel Products Company, high alloy steel melts are poured at temperatures up to 3100°F. from 500-lb. and 1000-lb. high frequency furnaces. For lining these furnaces the Norton Rx is MAGNORITE cement — used for mudding-up the coil, for the dry-rammed crucible lining and also for capping the crucible and forming the pouring spout.

Over the years the Alloy Steel Products Company, world's largest specialists in high alloy, corrosion resisting valves, have tested many refractory materials for the linings of their high frequency induction furnaces.

These tests proved that Norton MAGNORITE cement, engineered-to-the-job, lasted longer and performed better than any other material. As a result, Aloyco now uses MAGNORITE cement exclusively for lining these furnaces — still another example of how Norton refractories and refractory materials are *engineered and prescribed* to provide time-and-money-saving Rx's.

The Right Rx For YOU

For your own induction furnace operations, Norton will be glad to engineer MAGNORITE cement to your exact requirements. It withstands temperatures up to 3250°F. Its high-rammed density offers great resistance to metal penetration, erosion and chemical attack. And it is designed to expand slightly when sintered so that the crucible lining is free from shrinkage cracks that often lead to furnace failures. Why not run a test on one of your furnaces soon?

This engineering service applies, of course, to any metal-melting problem you may have. Working with MAGNORITE*, ALUNDUM*, CRYSTOLON* and fused stabilized zirconia cements and special shapes, Norton engineers are sure to come up with the right answers. For details, see your Norton Refractories Engineer, or write to NORTON COMPANY, Refractories Division, 300 New Bond St., Worcester 6, Mass. *Canadian Representative:* A. P. Green Fire Brick Co., Ltd., Toronto, Ontario.

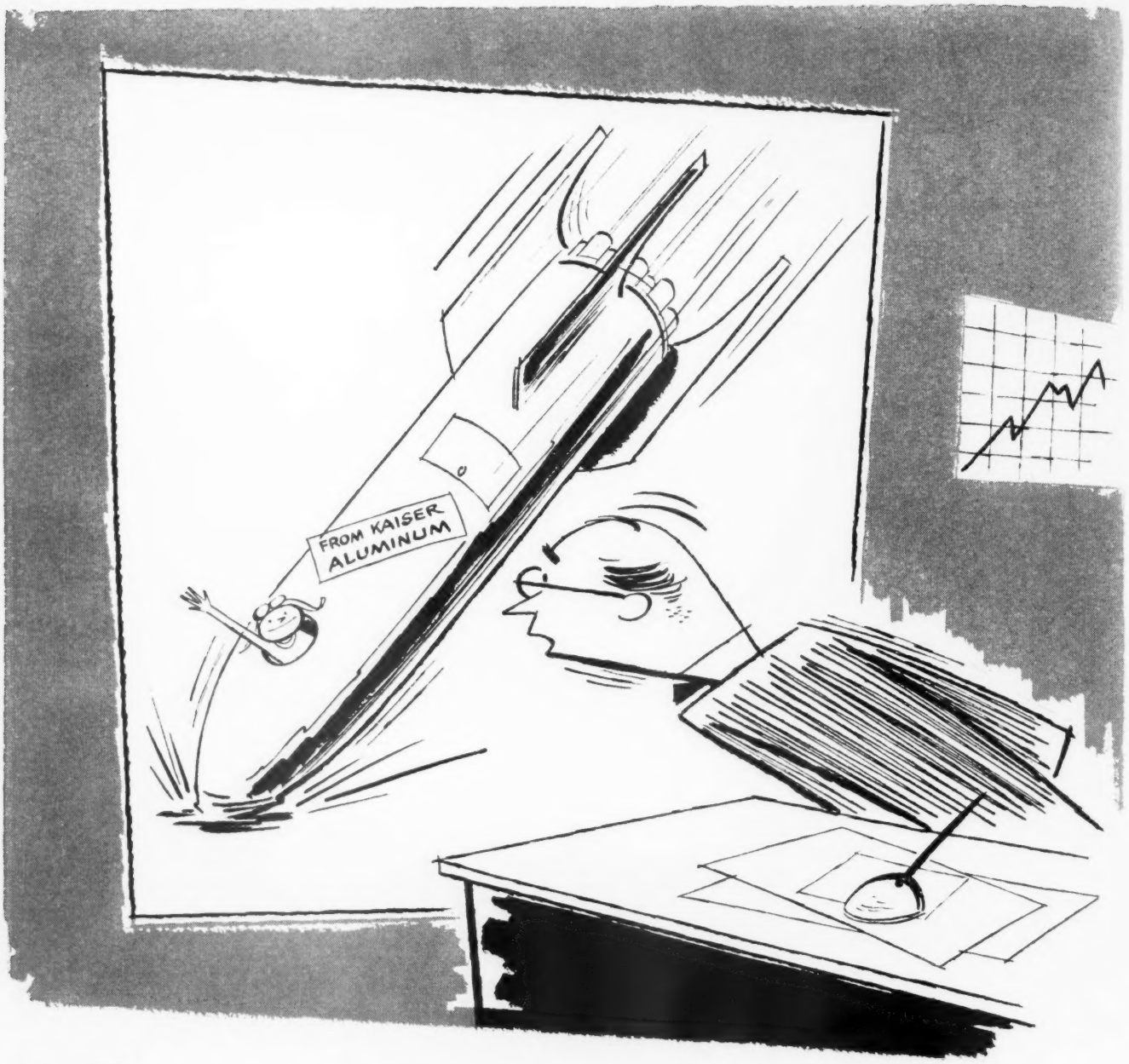
NORTON

REFRACTORIES

Engineered... Rx... Prescribed

Making better products... to make other products better

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries



Want faster delivery?

HERE's one important reason why users of pig, ingot and billet rely on Kaiser Aluminum:

Faster service and delivery on orders from our conveniently located plants at Newark, Ohio; Chalmette, Louisiana; Halethorpe, Maryland; Mead and Tacoma, Washington.

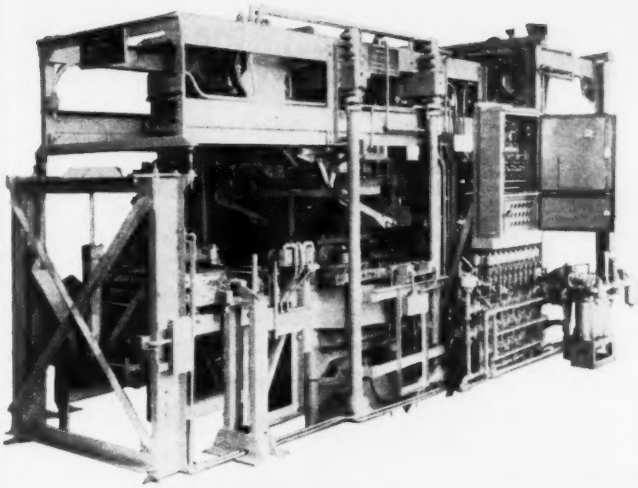
In addition, Kaiser Aluminum is a dependable source of supply because we are an integrated producer. We produce pig, ingot and billet to all standard specifications or to special customer specifications.

Our outstanding engineering service includes design assistance and other technical advice. For prompt personal service, contact the Kaiser Aluminum sales office listed in your telephone directory.

Kaiser Aluminum & Chemical Sales, Inc. *General Sales Office:* Palmolive Bldg., Chicago 11, Illinois. *Executive Office:* Kaiser Bldg., Oakland 12, California.

Kaiser Aluminum

The nation's largest supplier of pig, ingot and billet



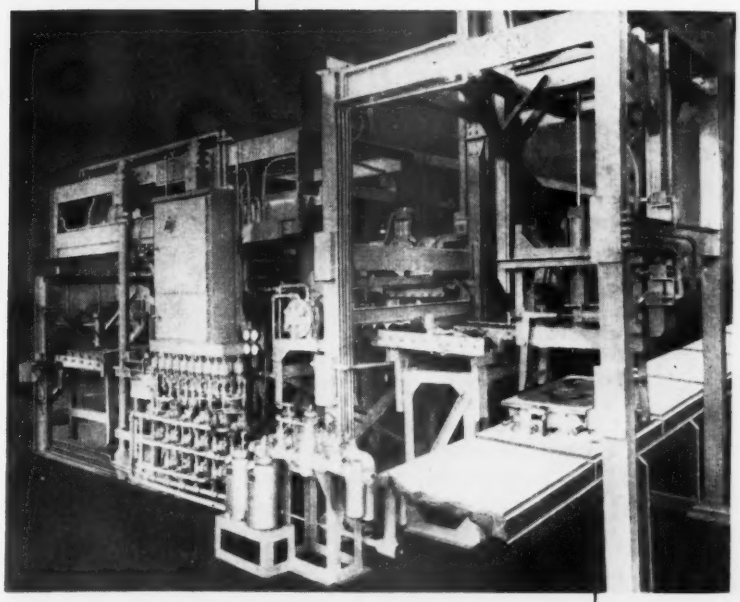
SHOWS FLASK ON FEED-IN ELEVATOR

"Push-Button" Operation Means The Ultimate in

INCREASED PRODUCTION . . .

ECONOMY . . .

QUALITY MOLDS



SHOWS COMPLETED MOLD AFTER BEING TURNED OVER, AUTOMATICALLY TRANSFERRED TO MOLD CONVEYOR

Every Nicholls Molding Machine is precision-built to insure the production of *continuously* better molds. They eliminate guess-work and costly mistakes. They put an end to dangerous risks. They effect major savings in materials and maintenance costs.

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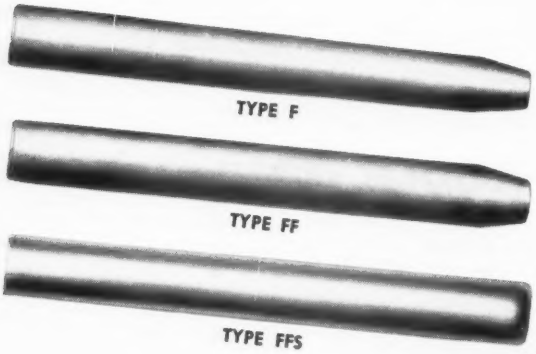

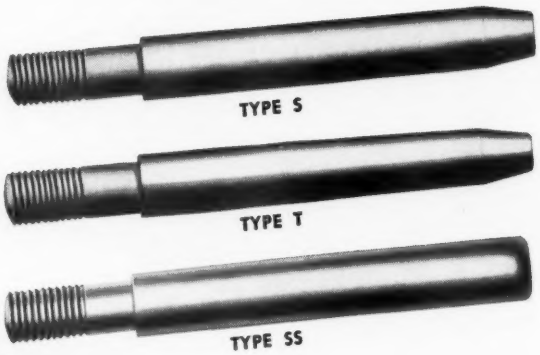

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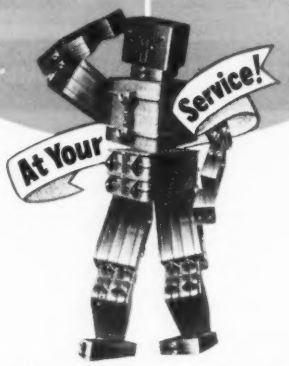

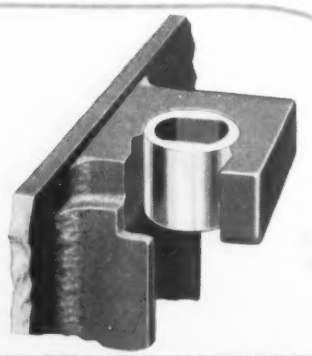

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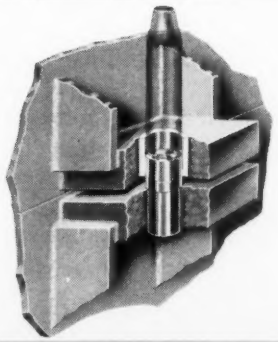

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The Trend Is Up

Foundries, along with many other industries, have gone through a difficult year. Estimates of production, based on preliminary reports covering nine months, indicate a total of approximately 14.6 million tons of all types of castings. This is a 17 per cent decline from the total of 17.6 million tons produced in 1953, although well ahead of the 13.2 million tons turned out in the depressed year of 1949. But the spotty condition of demand brought real difficulties to many, and the number of companies discontinuing production of castings during the year was the largest since World War II.

So much for history. Interest today centers in the future potential for castings sales. What can the foundry industry expect in 1955, and over the longer pull?

To obtain an answer to this question, the editors asked a number of leaders in important trade, technical and management organizations serving the foundry and allied industries. Eighteen men co-operated and have given their individual opinions on the future prospects for castings, and how these may be realized. These comments appear on the following eight pages.

Contributors are almost unanimous in the opinion that demand for castings will improve in 1955. Signs indicate that the period of adjustment has about run its course. Extent of the anticipated improvement ranges from a gradual rise of modest dimensions to a 15 per cent increase over 1954. Considering the opinion of the contributors as well as the general business prognosticators, it seems probable that foundry production in 1955 will fall someplace between the totals for 1953 and 1954, with some indication that it will be nearer the total for 1953, which was the second highest in the history of the industry.

Numerous reasons were advanced for the optimistic outlook. Inventories of durable goods have declined. Many pointed to the growth of population, confidence of leaders of the automotive industry, continued demand for housing, need for more and better highways, and the growing requirements for schools as excellent reasons for improvement in the demand for castings. Other factors mentioned include expansion in the field of electric power, chemicals and atomic energy, need for new public buildings and perhaps in the increased sale of household appliances, machine tools and farm equipment.

But improvement will not come without effort. Many comments developed the theme that the foundry industry must do a better job if it is to sell more of its product. Castings must be sold as an engineered product, and new uses must be provided through conversions. Castings must be made better and cheaper. Manufacturing techniques need improvement, and the industry must attract and hold the right types of men.

Yes, the trend is up. And the foundryman who makes a better product and does an intelligent job of selling should get the lion's share of the new business.

Frank G. Steinebach

Editor

You Can Sell More Castings in 1955!

What is the outlook for business in castings during the coming year? Definitely favorable—according to a number of leaders of the foundry industry. Their interesting comments on the subject are presented here.

In seeking opinions on market prospects *Foundry* questioned officers of the ten organizations which are members of the National Castings Council. The opinions expressed are those of the individuals and should not be considered as the official viewpoints of the groups they represent.

Members of the National Castings Council are concerned with a wide variety of foundry activities. They include: Alloy Casting Institute, American Foundrymen's Society, Foundry Educational Foundation, Foundry Equipment Manufacturers Association, Foundry Facing Manufacturers Association, Gray Iron Founders' Society, Malleable Founders' Society, National Foundry Association, Non-Ferrous Founders' Society and Steel Founders' Society of America.

Expanding Economy To Help Sales

By FRANK J. DOST, *President*
Sterling Foundry Co., Wellington, O.
President, American Foundrymen's Society

FRANK J. DOST

ATTEMPTING to forecast the future of an industry as basic as the foundry industry in a few short paragraphs could very well be an injustice to our industry, but there are some salient facts to give us courage.

As for the immediate future, 1955 appears to be a year of normal opportunities on the whole, with some internal adjustment tonnage-wise based on the individual demand for the various types of castings —gray iron, malleable iron, steel, nonferrous or light metals. Published data reveal that during the last eight years, peak tonnage for all types of castings was achieved in 1951, and second in line was 1953, down 8.9 per cent. While 1954 figures are not yet available, it is safe to assume that

over-all tonnage will be less than 1953; however, reliable sources predict that our nation's industrial production for 1955 will improve approximately 4 per cent over 1954. If the foundry industry maintains its rightful position in our national economy, it too can add impetus to the upswing for a better year, possibly equaling 1953.

In appraising the long range future, we must realize that with an annual population growth rate of 1.7 per cent since 1950, we have a potential population increase of 30 million in the next ten years, equivalent to 30 cities the size of Cleveland. The impact of this growth in terms of housing, transportation, highways, utilities and other necessities of life, represents a tremendous natural market. In terms of gray iron alone, based on the present usage per capita of 171 pounds per year, we can establish a ten-year market of 2½ million tons over and above our present market.

Other markets must be developed through product improvement. We must make our castings more attractive to the casting user, and if our industry makes as much of a stride in the next twenty years as it has made in the last twenty, there will be no doubt about its future. Space does not permit a broad enumeration of these advancements but with all phases of our industry working together for greater progress in research, education, equipment and methods, our industry can look forward to even greater importance in our national economy.

Merchandising Practices at Fault

By THOMAS KAVENY JR., *President*
Herman Pneumatic Machine Co., Pittsburgh
President, Foundry Educctional Foundation and NCC

THOMAS KAVENY JR.

THE NEW year of 1955 should prove to be a most interesting one for the foundry industry. Whether we want to acknowledge it or not, we in it are generally known as poor merchandisers. Instead of selling castings as an engineered product, we frequently concentrate our efforts in rapping other types of castings while promoting our own. Such practice hurts the whole industry by frequently causing substitutions of other products.

The foundry industry has made tremendous strides in the past few years. Castings of *all* types have improved in quality, as well as in physical and chemical characteristics. They can be made better and cheaper.

Of great aid in this forward progress has been the research programs of the industry's various societies as well as that of many companies and of new types of foundry equipment and supplies. Just as important are the thousands of engineers trained in the basic foundry science who are being funneled into the industry by the engineering schools that are supported by the foundry and its allied industry through an almost unique program.

There is a great future for the foundry industry, but it must be sold. Many foundries today compare favorably with any other industrial plants. They are just as clean, they have as modern equipment, their research programs are equally extensive, and their personnel are as well or better trained.

Let's be proud of our industry, let's show our pride and let's brag about it. Let's sell castings!

Big Users Spur Castings Consumption

By DONALD H. WORKMAN, *Executive Vice President*
Gray Iron Founders' Society, Cleveland

DONALD H. WORKMAN

WHAT are the prospects—immediate and future — for the foundry industry? A quick answer might be found in the many comments heard at a recent Metal Show to the effect that "the only things *new* here are casting techniques!" These comments emphasize the rapid strides made by this fifth largest, and oldest, basic industry during and since the war. New casting techniques, and remarkably improved quality and properties of foundry products themselves, have more than kept pace with the efforts of competitive industries to capture all, or part of, our markets. Today's competitive conditions in the foundry industry itself have only aided and abetted this interesting race to gain new markets for castings and to recapture markets which were occasionally lost during lush times when such losses were missed little, if at all.

We believe there has been a definite leveling off to what we might call normal foundry operations. Because of consumer and manufacturer confidence in the future, we expect a gradual rise—not a boom—in our shipments for 1955. The new year should end with gray iron shipments near 13,000,000 net tons—another good year.

The best way to analyze gray iron's future potential is to look at some recent society statistics on the many industries which consume our products. The over-all picture is good. Our customer industries are healthy and are making heavy capital expenditures for expansion.

Gray iron's No. 1 customer, the automotive industry, has unbounded confidence in the future. The steady expansion in number of cars in use as our growing population demands more and more transportation increases the responsibility of the building and construction industry, gray iron's second largest customer. Already pressed to capacity in 1953 and 1954, this great industry must provide more roads, more garages, more homes, more schools and more office buildings to accommodate more cars and more people. This expansion will also tax gray iron's third largest castings buyer—the utilities.

Machine tools and machinery, high on our customer list, will be called on to maintain the rugged

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pace of the "go-go" productive economy of the automation age in which we find ourselves.

All of this customer confidence sums up foundry confidence for the long pull. Gray iron will take its fair share of this good business ahead.

Intensive Selling Effort Is Needed

By CHARLES E. BRUST, *President*
Eastern Malleable Iron Co., Naugatuck, Conn.
President, Malleable Founders' Society

CHARLES E. BRUST

GENERALLY speaking, we of the malleable castings industry share in the opinion of many business leaders and economists that the period ahead will be one of modest recovery. It is dangerous to predict the level of business in 1955, but there are many indicators supporting the conclusion that durable goods production will exceed 1954 output by at least a small margin.

We are in an expanding economy as a result of population growth and an insatiable demand on the part of our people for more and more goods and services. The malleable castings industry should share in the economic growth of the country, although to do this will require concentrated effort to develop new uses for malleable castings, either as the result of the development of new products, or by showing manufacturers how they can obtain a better product by converting from other metals or other forms of fabrication to the casting process.

The Malleable Founders' Society has devoted much of its effort during the last several years to what we choose to call promotion. The research part of this program has been directed toward better quality control and better manufacturing technique. Our sales efforts have emphasized better salesmanship and better customer relations. This concerted effort on the part of our industry is designed to expand our markets by acquainting the users and potential users of castings with the quality of our product from the standpoint of physical properties, machinability and castability.

We believe we have the best product in the casting field and one which should achieve still greater recognition. To do this, however, will require intensive selling effort. In this connection, we are encouraged by the enthusiastic interest shown by many manufacturers in uses for pearlitic malleable castings. It is our hope and expectation that the conversion to pearlitic (again from other materials or means of fabrication) will result in an expansion of our market, since we do not contemplate any appreciable amount of switching from standard malleable to pearlitic malleable.

Efficient Unit Has Nothing To Fear

By W. J. CLUFF, *President*, Frederic B. Stevens Inc., Detroit
Vice President, Foundry Facing Manufacturers Association

W. J. CLUFF

IT IS my firm belief that the foundry industry as a whole will experience a strong upward trend in production and profits in 1955. Several factors will contribute to this improvement and have been pointed out by numerous business forecasters in recent months.

There should be a substantial increase in the demand for automobiles, household appliances, farm equipment, powerhouse equipment and the hundreds of other products of which castings are an essential component.

As to the future years, "the long pull," there can be no doubt as to the dominant role which our industry must play. One need only consider the modern production foundry, completely mechanized, under rigid technical control, a vital force in the field of manufacturing for the world market.

Assuredly, the going may be rough for the inefficient units, as it has been and will be in every line of industry in the United States. But those who make full use of American ingenuity and know-how have nothing to fear. 1955 will be a "good" year.

Adjustment Period Has Run Its Course

By H. A. WHITE, *Manager*, Smeeth-Harwood Co., Chicago
President, Non-Ferrous Founders' Society

H. A. WHITE

WE OF the nonferrous foundry industry experienced an adjustment period in 1954, some of us severely, some mildly. I believe it has pretty much run its course. Reports indicate that buying is picking up to production levels. In addition, all signs seem to point to an increased tempo of operations in the industries most necessary to general prosperity for all. This will certainly include more activity in nonferrous castings.

Of course, with undercapacity loads in our foundries, there is and will continue to be increasing pressure both from within our industry and from outside processes and developments which will require resourceful selling to overcome. Both ob-

stacles, though sometimes discouraging, are ultimately healthy and inspiring.

Those individuals of our or any industry, who, with abiding faith in the long-pull industrial progress of our United States, will give free rein to their imagination and ingenuity (plus plenty of hard work) will not only survive but will be the leaders who will assure the industry its continued advancement, come hell or high water.

The nonferrous foundry industry has a very definite and important place in our national economy in peace as well as war. True, for many years, except in scattered instances, it has lagged behind current technological progress, but since the beginning of World War II, great strides have been made toward "catching up with the parade."

Certainly, with the awakening to the benefits of research and modern methods, we will expand our uses and markets. We look forward with the utmost confidence to a long and steady increase in the demand for and use of our products.

Technical Progress Must Be Pushed

By EDWARD J. WALSH, *Executive Direc'or*
Foundry Educational Foundation, Cleveland

EDWARD J. WALSH

STATISTICALLY, the future of the foundry industry is bright. Based on growth factors inherent in our economy, we can expect considerably larger markets for castings over the long run. There is danger in this expectancy, however, unless the foundry industry is determined to match its technical progress with that of the rest of our industrial economy. We shall not automatically inherit a definite portion of the future market without effort. Other industries, particularly competitive industries, also are alert to the possibilities and can be expected to do everything to better their share of this promising future.

Our progress and prosperity will depend upon ideas—ideas which will mean new and better ways to produce quality products to meet the challenge of the future. These ideas will come from men, and unless the foundry industry can attract the right type of men, in sufficient quantity, we will lack the leadership necessary to the task.

Our greatest manpower need lies in the field of engineering and it is our responsibility to see that cast metals become an integral part of the education of the greatest number of engineering students. On one hand, we must create a pool of technical manpower for employment within the industry. On the other, we must indoctrinate engineering students as potential customers, with a knowledge and appreciation of cast metals. The progress and prosperity of the industry must be defined in terms of both production and consumption.

After centuries of slow but steady progress, the industry has reached the threshold of a new and revolutionary era. Through a process of industrial evolution the craftsman and artisan has given way to the scientist and engineer. The foundry industry is molding its own future.

Expects 10-15 Per Cent Gain in 1955

By JAMES W. WOLFE, *Executive Secretary*
Non-Ferrous Founders' Society, Chicago

JAMES W. WOLFE

IN A forecast of business prospects for nonferrous founders during 1955, one factor must be considered: Will we or will we not have an incident similar to Korea? If we do have a hot spot in the cold war, all foundries will be busy. If we do not, we can expect a more normal pattern.

In 1949, heavy inventories of durable goods and high metal prices, together, brought on a 30 per cent decrease in foundry volume. Abnormally high inventories at the end of 1953 and higher metal prices again materially reduced volume during 1954.

There are many encouraging signs: Inventories of durable goods have declined measurably; present orders are not large, but call for immediate delivery; home building is maintaining its accelerated pace because of a fast increase in population; buyers are accepting increased metal prices; manufacturers are developing new products; the government is considering a long-range road building program which, with new products, will call for more specialized machinery; money is easy. The road signs are good.

But, other methods of fabrication, including plastics, will tend to minimize any large upswing in the use of nonferrous metals unless the entire industry makes a concerted effort to develop new and better products and adopts, wherever possible, new technologies to combat these new competitive factors.

Under present conditions, we should expect a 10 to 15 per cent increase in volume in 1955 over 1954.

Better Quality Will Broaden Markets

By CHARLES H. KER, *President*
Dalton Foundries Inc., Warsaw, Ind.
President, Gray Iron Founders' Society, Cleveland

CHARLES H. KER

I BELIEVE that the future business potential of the gray iron foundry industry is boundless! That opinion is based not alone upon the increasing need for gray iron castings in the years ahead nor upon physical plant facilities, production tools, and raw material, all of which have kept pace with latest developments, but principally upon the people who man the many small units

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which make up our industry.

Economists and seers tell us that general business in 1955 will be a little better over-all than 1954, with continued narrowing of profit margins and some soft spots.

Our industry has been rubbing elbows with those "soft spots" and "narrow margins" for some time and individually and collectively has been meeting the situation by constantly improving manufacturing techniques, using sound costing methods and adapting its product more closely to the requirements of the customer. We now produce a truly useful and needed engineering material quite different from the lowly casting of yesteryear. No longer are we fighting a rear guard action against the encroachment of new (and old) materials upon our markets; rather, we have the heavy armament for a sustained offensive in their claimed territory.

After one visits many foundries and talks with the people—managers, foremen, molders, sweepers—confidence in the future becomes enthusiasm! Management is close to operations and to customers; ideas find an open channel from shop to office to user, and the reverse. There is an intense interest in producing the best component part in the most economical manner, and owner-management does not hesitate to back new ideas and methods with money and hard work.

As our American economy continues to expand, the gray iron foundry industry will be among the leaders.

Sees Need for Better Casting Design

By GUY A. BAKER, *Vice President*, Duriron Co., Dayton, O.
Vice President, National Castings Council

GUY A. BAKER

NOW that 1955 is upon us, the trend of the foundry industry will be affected little, if any, by what its members do or leave undone. Many foundrymen feel that the low point of the present period of readjustment was reached several months ago, and although we seem to be coasting along on a low plateau, factors already are in force which will result in a moderate upturn in production as the year wears on.

This year will see continued exploitation of new and improved techniques and devices. Shell molding, investment casting, sand reclaiming, pneumatic sand conveying, dielectric core baking, etc., will find some additional converts. These contributions alone will not assure the growth of the industry at the maximum rate.

If the foundry industry is to do more than hold its own, it must make not only better castings, but in many cases cheaper ones. One way to do this is to look at casting design. Too often an engineer considers strength, tolerances, eye appeal and similar factors and passes along to the foundry a design which is makeable, but far from the cheapest way to make the part. It is the responsibility of the foundry industry to convince the design engineer that foundrymen should be consulted early in the design stage.

The most likely source of "new" casting business lies in the capture or recapture of business now going to weldments and drop forgings. The raw material used in weldments is mass produced, and with a little cutting and welding it is ready for use. With drop forgings the advantage is even greater because both the raw material and the forging are made by mass production techniques. Foundries must raise their sights above the jobbing level and think and plan in terms of streamlined, large quantity production if full advantage is to be taken of the potential which exists.

Modernization Is Key to Survival

By EDWARD H. KING, *Vice President and General Manager*
Hill & Griffith Co., Cincinnati
President, Foundry Facing Manufacturers Association

EDWARD H. KING

THE TREND of the foundry industry will be definitely upward during 1955. New methods and improved techniques should increase strongly the total tonnage of castings in the years ahead. Unfortunately, competitive periods from which we are just emerging tend to eliminate the high-cost producers; therefore the drop in productive capacity must be picked up by the remaining foundries. The forced draft mechanization of the defense period and the improved techniques in all phases of the metal trades have made indelible changes in foundry markets and created higher standards of dimensional accuracy and metallurgical quality.

It is no longer necessary for the small foundry to look with envy at a well-equipped larger foundry and say, "We can't afford it." To survive, it is necessary for all foundries to modernize in the field of material handling and flow, sand preparation and melting equipment and to provide controls to assure consistent operation. Fortunately, foundry equipment is available today so scaled in capacity as to serve with equal facility the small or large foundry, and it is a proved fact that with intelli-

gent planning and practice, this equipment will reduce costs, pay for itself and provide a profit.

Sand additives and molding equipment are available today to produce castings to precision levels of dimension and finish that only a few years ago could not possibly have been attained. We are moving fast in the foundry from an industrial art to the level of a highly technical and immensely interesting science. A foundry that does not recognize these trends and facts will not long survive. Better castings, of consistent quality, produced with lower man-hours per ton, are the key, for here lie profit and security and the assurance of survival.

Dr. Kettering is credited with the statement: "We can no longer do tomorrow what we are doing today." This type of forward thinking can guide our planning, and it places the spotlight on opportunity. The courage and enterprise with which the foundry industry has met and surpassed the improved processes in other fields of metalworking surely will win greater acceptance for castings of controlled quality in tomorrow's market.

Research and Development Aid Outlook

By A. J. McDONALD, *Vice President*
American Steel Foundries, Washington
President, Steel Founders' Society of America

A. J. McDONALD

SINCE the close of the Korean hostilities, the demand for products of the steel casting industry has been in a downward trend. Indications are that the low point was reached in midsummer and that the trend is now upward with good prospect of improvement and gathering strength during 1955.

Inasmuch as quite a number of the many industries regularly served by steel castings producers are reporting demand improvement in their respective fields, we have a factor which is most encouraging in view of the extent to which inventories have been reduced.

Reasons for expressions of optimism over the long-term future of steel castings have never had a more firm foundation, because of what the industry has been doing to help itself.

Financed on a co-operative basis, persistent and continuous technical research and development programs have been carried on for a number of years and participated in by the best minds available for undertakings of this character—resulting in new and greatly improved technical and manufacturing procedures, accompanied by many new types of foundry equipment.

As these advances are now being rapidly adopted by steel foundries throughout the country, they are having marked effect on production of steel castings of higher quality and greater dependability for a constantly expanding scope of uses in applications requiring high strength, resistance to shock, impact, wear, heat, corrosion, or combinations of these properties.

These developments, as well as those in the educational field, will eventually have the effect of causing engineers and designers to acquire a broader knowledge of the advantages possessed by steel castings which in many instances have not been well understood. These and other developments caused a group which very recently concluded a survey of the steel castings industry to predict that in the next 25 years steel castings production will expand nearer to 100 per cent than to the 62 per cent the Paley Commission predicted for all forms of castings.

Equipment Servicing Needs Attention

By WILLIAM B. WALLIS, *President*
Pittsburgh Lectromelt Furnace Corp., Pittsburgh
President, Foundry Equipment Manufacturers Association

WILLIAM B. WALLIS

THERE is a very definite feeling that foundry business will be better in 1955 than it was in 1954—there are already indications of that upward trend. James H. Smith, general manager of Central Foundry Division of General Motors Corp., makes the statement that he knows of no time when the future of the castings industry has been as promising and full of potential as it is today.

The foundry equipment manufacturers have been at all times alert to the need for improvement of their equipment and have devoted much time to research. As a result, American foundry equipment is the model for the balance of the foundry industry in the world.

For 1955 they have the equipment to fit the needs of industry, but there are two phases of work that must be intensified. First, is the over-all job of selling, which is getting to be a lost art. This means maintenance of personnel contacts at higher management levels as well as increased activity on the part of the regular sales and engineering staffs.

Second is the servicing of their equipment already installed. The foundry equipment manufacturer has been more or less continuously, since 1940, busy with an attempt to fill orders. He has built the equipment, supervised its erection in the purchaser's plant and then, after seeing it in satisfactory operation, has moved on to the next job without any consistent follow-up to keep tab on just how the installation has been going after a year's service.

We have heard this criticism of the foundry equipment manufacturers from a number of sources over the past few years, and it seems to us that along with selling we have got to do a lot more contacting of our users than has been customary in the past 15 years.

Business for foundry equipment manufacturers in 1955 will be an improvement over the past year.

You Can Sell More Castings in 1955!

It will not be wartime business, but it will be good business for those manufacturers who actively pursue their selling and take care of the servicing of their equipment.

Inventories Likely To Stay Low

By CHARLES T. SHEEHAN, *Executive Secretary*
National Foundry Association, Chicago

CHARLES T. SHEEHAN

PRECLUDING unforeseen pressures from external forces, the new year will be marked by a slow, somewhat laborious rise in castings activity. The period from mid-1953 through the third quarter of 1954 could be termed a period of transition from an abnormal postwar economy based on scarcity to a normal competitive economy. During this period, nationwide business activity fell off approximately 10 per cent. Current demands should maintain it at—or slightly above—this level.

Foundry activity tapered off more than normal because of inventory reductions—particularly in the capital goods and consumer durable industries. Inventories are now at a minimum—and probably will be kept that way. Even so, the normal force of current demands will bring castings activity to within 10 per cent of 1953. Orders, particularly for the smaller job shops, will call for immediate delivery. Jobs with 30 days or more lead time will continue to be a rarity.

Consumer durables will move a bit better now that the "doom and gloom" election propaganda is over and forgotten. Road building should be up over its present high levels—but this may well be counteracted by a slight drop in construction activity.

Labor was comparatively easy on the foundry industry in 1954. Any slight upturn might find it doubly demanding in 1955. It will take skillful preparation and bargaining to maintain a company's competitive position without a walkout.

Castings technology has improved tremendously in the last decade. Whether the strides in castings technique and processes have been brought about by specialization or caused the present trend towards specialty shops is a matter of conjecture. However, if one word can keynote the foundry industry's future, it is "specialization."

Most Steel Foundrymen Expect Upturn

By F. KERMIT DONALDSON, *Executive Vice President*
Steel Founders' Society of America, Cleveland

F. KERMIT DONALDSON

RECENT surveys indicate that about 60 per cent of steel foundrymen expect 1955 to be a better year than 1954. For the future long-term trend, most foundrymen are optimistic. This feeling is based on the assumption that steel casting production will follow in the future, as it has in the past, the rising trend of the Federal Reserve Board Index of Industrial Production. Although the fluctuations in the steel casting production index are much wider than those in the Federal Reserve Board Index, when the feast and famine periods are leveled out the industry generally has followed the increasing trend in the Federal Reserve Board Index.

The industry has demonstrated its ability to come back in the face of strong competition. Ever increasing use of composite fabrication with rolled products and the use of cast-weld procedures have broadened the markets, and an aggressive policy of exploiting the design freedom of the steel casting process itself has resulted in many new developments. A greater interest in technological advancement through research and technical study of manufacturing processes and cast steel properties has increased the store of industry knowledge and sparked the impetus toward the production of higher quality castings.

Expanding markets opening up for the industry in the future will be found in the atomic energy field; in electric power production; in mining—particularly in the uranium ore fields and in the processing of taconite for blast furnace use; in the hydro-electric power field; in construction; in the fast expanding chemical industry; and in the requirements for increased tonnages of basic steel products.

Moderate Gain Seen in High-Alloy Use

By E. A. SCHOEFER, *Executive Vice President*
Alloy Casting Institute, Mineola, N. Y.

E. A. SCHOEFER

DURING 1955 production of high-alloy castings is expected to increase moderately from the 1954 level. The readjustment of demand, following the extremely high shipments of the Korean armament program, started in the latter part of 1953, but now appears to be about over. Shipments of heat and corrosion resistant iron-chromium-nickel castings in 1954 fell to roughly 75 per cent of the 1953 output, reflecting the general decline

in industrial production for the year. No expansion of present high-alloy foundry capacity, therefore, will be required to meet the prospective 1955 demand, and none is contemplated.

Increased ordering of high-alloy castings will doubtless come from the chemical processing, petroleum, heat treating and other industries where corrosion and high-temperature processes are involved, now that inventory adjustments have been made and operations are on a more even keel. Continuing modernization programs in many industries will also create a demand for castings in new equipment. Expanded use of cast alloys in aircraft for both engines and air frames seems assured, and the requirements of nuclear power developments are just beginning to be explored.

Research by the Alloy Casting Institute and by individual members of the industry is going forward in the development of new and improved alloys for special service conditions. High alloys are being cast successfully by the shell-mold process; corrosion-resistant castings of very low carbon content are available commercially; and heat resistant castings are finding increased application at extreme temperature ranges (above 2000°F). The industry, accordingly, will be in a position to meet the future demand for construction materials having the properties needed for advanced process designs involving severe corrosives and high temperatures. Thus, although no major upswing is foreseen for alloy casting production in 1955, the outlook for long-term growth remains excellent.

Pearlitic Paces Demand for Malleable

By LOWELL D. RYAN, *Managing Director*
Malleable Founders' Society, Cleveland

LOWELL D. RYAN

I BELIEVE it would be the consensus of our segment of the ferrous castings industry that 1955 will be another year of intense competition and, assuming that the race will be "won by the fit," it is evident that to meet this competition, we will have to be more aggressive than ever in many respects. This will include attention to plans for modernization or mechanization (as the circumstances warrant) and will also require still greater effort in the fields of promotion and selling.

On the basis of general economic indications, I would expect that business will be better in 1955 than in 1954.

The prospects for increased business in the years ahead for our industry seem to lie in the pearlitic malleable field. The tremendous interest in and demand for pearlitic malleable castings during 1954 augurs well for those in our industry who make pearlitic malleable. The automotive, agricultural implement and other major industries are using more and more pearlitic, and are showing greater interest every year in the good qualities of this material.

The Society is steadily expanding its program in the fields of research, product improvement, product promotion (through advertising and other programs) and through the sponsorship of sales engineering clinics at which industry salesmen, and especially the newer engineers in the field, are given an opportunity to exchange ideas on effective techniques of "engineering selling." It is the conviction of our industry's leaders that the future expansion of our market depends largely on the extent to which we do an aggressive job of training competent salesmen, and the skill displayed by them in designing components which will do the job a customer wants done in an efficient and economical manner.

Outlook Is Mixed in Some Markets

By W. W. C. BALL, *President*
Taylor & Fenn Co., Windsor, Conn.
President, National Foundry Association

W. W. C. BALL

THE FOUNDRY industry is always looking to the future. During the 40 years I have been associated with the foundry industry, we always have had to have a keen eye to the future and a real spirit of optimism.

The year 1954 has seen many changes among foundries. Firms established for more than 50 years have closed their foundries. Even modern well-equipped, highly mechanized foundries have closed. Competitive pricing has known no ends. Captive foundries have again come into the marketplace to sell their wares. Buyers who found themselves without a source of supply in times past when the captive shop became busy will not be fooled by promises again. The newcomer and a few others must learn the hard way.

Casting prices under present labor demands cannot possibly go lower, unless we are to have more competition such as we have in Connecticut from a one-man foundry. At the present time, if a buyer goes far enough he can purchase castings on the basis of so much a pound, at whatever price he wishes to pay. In view of the above, it would seem that the price situation cannot possibly get worse.

Of course, if a buyer wants castings of superior quality, with a guaranteed analysis, thoroughly cleaned and delivered on the data promised, he has found it wise to stay with his regular sources.

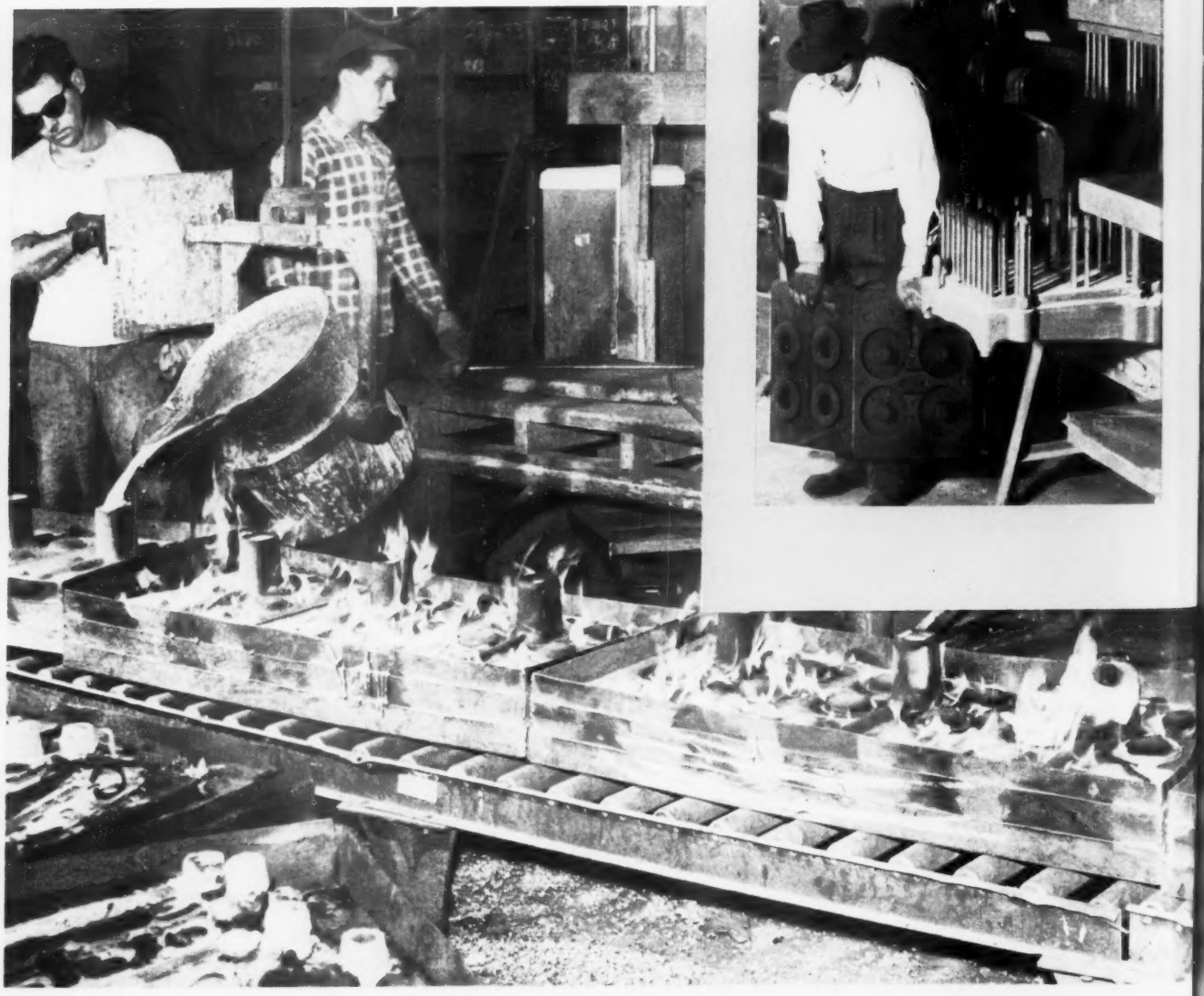
It is hard at the moment to determine a trend in the East. For some time I have been contacting buyers and other foundries, hoping to get a clear picture. However, the reports are very confusing. With few foundries busy, with some busy on certain lines, and the majority on short time, the picture at present does not seem bright. However, most of my contacts were optimistic. They felt there were many indications of a pickup, either shortly or at least in the next few months.

SHELL MOLDING

Is Easier • • *now than it was two years ago or earlier. In this article, which is in the nature of a progress report, the author explains how new equipment and techniques have been created to make the process easier and less expensive to use*

By RAY OLSON
Vice President
Production Pattern & Foundry Co.
Chicopee, Mass.

Fig. 1—Horizontal pouring of a medium-section gray iron casting. Note the absence of weights or other supports



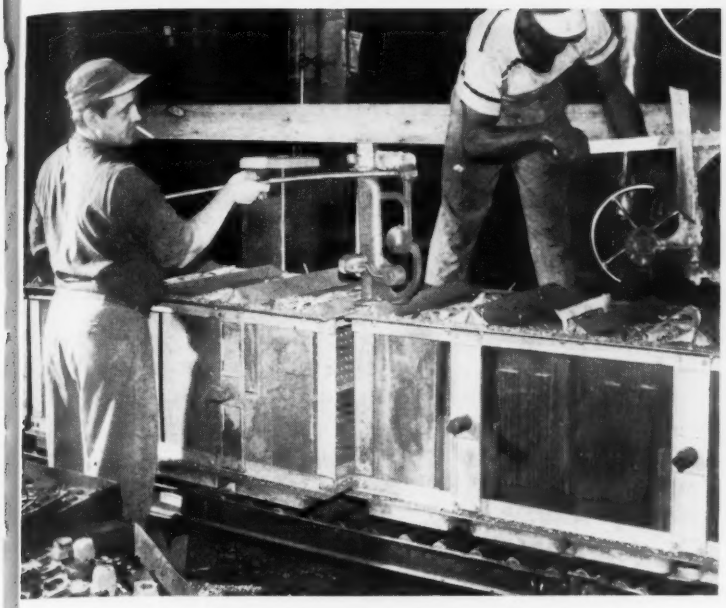


Fig. 2—Vertical pouring is confined to special jobs. This manifold has 1/32-in. tolerance on smoothness and straightness of the cored hole

Fig. 3—Pattern-change dolly simplifies job changes on the shell molding machines. Patterns can be changed in just a minute or two

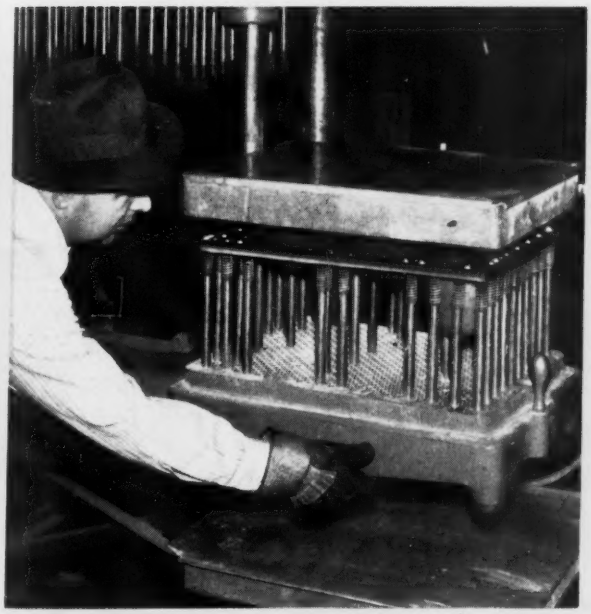


Fig. 4—Left to right, steps in bonding: Breaking mold; applying bonding resin to hot lower shell half; setting cores before placing top and finishing pressure cycle

SHELL molding is easier than it was almost two years ago, when the author last wrote about the shell molding operation at Production Pattern & Foundry Co. We have found it easier than attempting to accomplish the same results with other foundry techniques.

The biggest step we have taken in shell mold casting is changing to horizontal pouring of molds, Fig. 1. This step became possible through the use of a shell bonding fixture which cements or bonds the halves of a mold together so that they may be poured without backup or support. By horizontal pouring we mean pouring either in a perfectly flat plane or with the mold tipped at a desired angle for better metal flow.

We do not feel that horizontal pouring can be universally used, but it provides the cheapest and best answer to the great majority of our casting applications. In the vertical pouring of many different metals, when shells of thin or medium thickness are used, the molten metal has sufficient head pressure to burn through the back of the

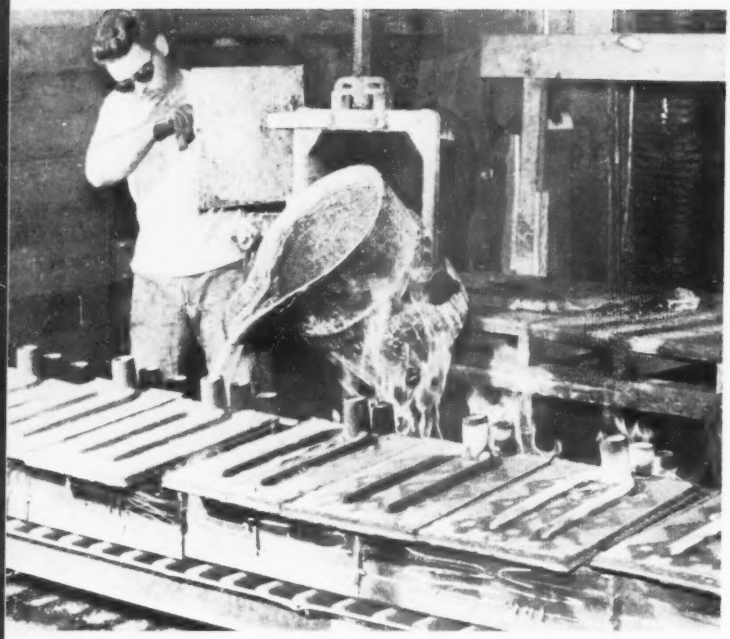


Fig. 5—Molds for castings of light section are stacked three high and nine to a pouring tray

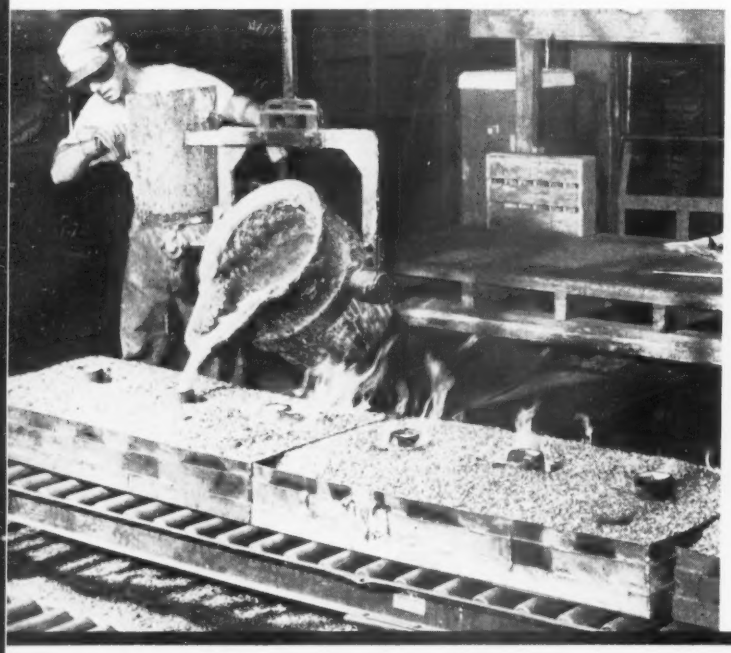


Fig. 6—Sometimes a light layer of gravel helps to insulate cope side of heavy-section castings

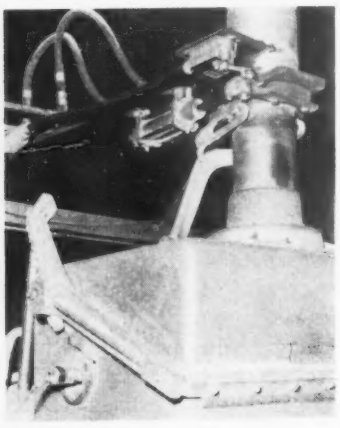


Fig. 7—Automatic sand-feed attachment on shell molding machines eliminates need for operator's attention to sand level in the investment chamber

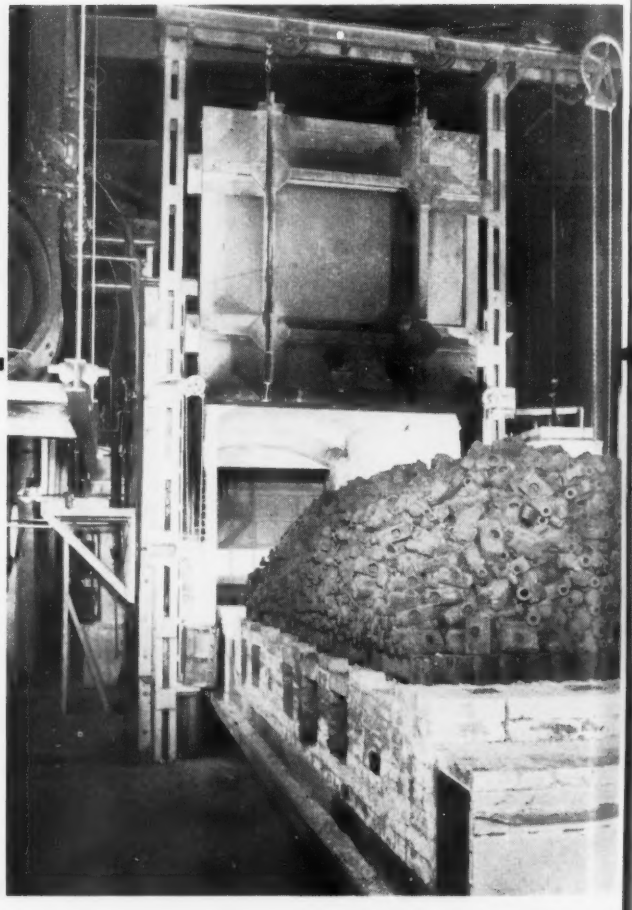
Fig. 8 — Author's foundry stress relieves or anneals tons of green sand and shell castings daily, according to the specifications of its customers

shell if no support is provided. To prevent this situation, steel shot, gravel or sand commonly has been used.

This backup material, together with the box or flask necessary to hold the mold or group of molds, presents both a capital expense and a constant material handling problem. We still have a few jobs which must be poured vertically, because of conditions involved. In two such parts, Fig. 2, we have an extremely rigid tolerance as regards the straightness of a long cored hole. The only satisfactory way to maintain this straightness is to pour the castings with the cores in a vertical plane so that the molten iron exerts equal pressure all around the core.

We feel that our shell bonding operation alone has made it possible for us to consider almost any part as a prospect for shell molding. All that is required is that it fit into either our 15 x 20 or 20 x 30-in. molds. Weight of the casting is no longer a problem. By judiciously increasing the shell mold thickness as we get into heavier casting cross sections, we can handle castings of practically any thickness. We have converted many parts from our mechanized green sand foundry operation to shell molds with lower foundry costs. This does not take into consideration any savings realized by our customers due to shell molding advantages. There is still the problem, however, of increased pattern cost when converting to shell in the average foundry. We will bring this out a bit later.

Our foundry has many short-run jobs which call



for a lot of pattern changes, Fig. 3, on the shell molding machines. We can change patterns in a minute or two on the machines and set up the shell bonders as easily. Each job has a Masonite or metal plate the same size as the shell mold. This plate is drilled with a series of small holes about 2 in. apart around the casting cavities and around the runner system. It becomes the bottom of the applicator tray in our shell bonding fixture, Fig. 4. The pressure pins which support and squeeze the mold during bonding can be arranged in a minute in any desired pattern, both above and below the shell.

Usually, we arrange the pressure pins around the perimenter of the mold, in line with the holes in the applicator plate. A paper template can be used to speed up placement of the pressure pins.

A vibrator deposits small cones of long-flow phenolic resin at desired spots on the joint face of the shell mold. Both cope and drag shells come right from the shell molding machine and have enough latent heat to make this deposited resin flow. Cores may be set either before or after the resin is deposited, depending upon their height above the joint face. It is desirable to bring the lower half of the mold to within ½ to 1 in. of the bottom of the applicator tray to establish the best cone pattern.

We do not move the applicator tray. This fact is most important. Moving, shaking or vibrating this tray can spill resin into the casting cavity, causing scrap in some instances. After cores have been set and the mold closed, the assembly is pivoted into the pressure area, at which time the operator hits the buttons, starting the timed pressure cycle.

Normally, the long-flow resin melts into the mold interface and solidifies in 20 to 30 seconds. We have found that approximately 40 lb of pressure per contact point is required to bond a shell mold properly with a fin-free joint. After the previously set timer has completed its cycle, the press releases and the operator may remove the mold, which

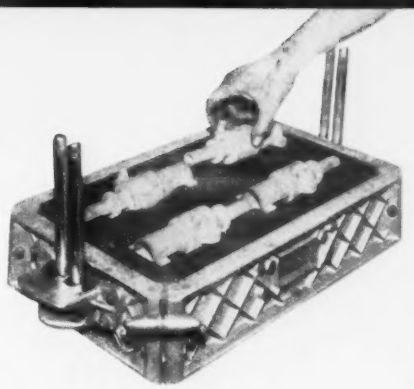


Fig. 9—Answer to many problems of green sand foundrymen may be shell cores. Here they are being set into a squeezer mold

can be poured immediately or in six months without noticeable difference in the castings.

Some foundries have found that shell molds lend themselves to stack pouring through one common downsprue, 6 to 12 molds high. The class of castings we make and the short runs frequently handled have made this technique undesirable in our shop. We do, however, stack many of our molds, to save time and space in pouring. These are molds which we pour at a slight angle, such as 10 degrees.

The downsprues are set near one end of the mold, and we can stack molds three high, Fig. 5, with the edge of the upper mold adjacent to the inside edge of the downsprue of the mold below. Actually, the reason we are limited to three high is because of our shell mold pouring trays. These trays were designed to hold three molds in a horizontal position, and by stacking as described we are limited to nine molds per tray.

Obviously, such stacking is difficult with larger, heavier castings, as shown in Fig. 6. First, the casting projections both above and below the shell are a handicap, and second, in most of these castings, the downsprue is somewhere near the center of the mold.

Sand plays a very important role in a shell molding operation. After using many different sands, we have come to the conclusion that for the class of castings we are pouring in gray iron, the least expensive sand works (*Please turn to page* 148)

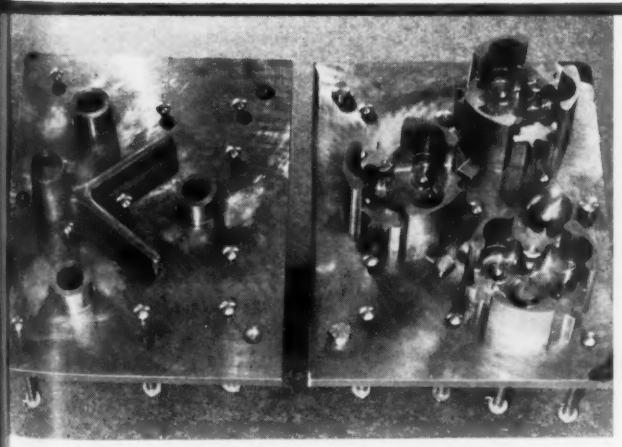


Fig. 10—Thousands of castings have been made from this alloy iron pattern, shown here new

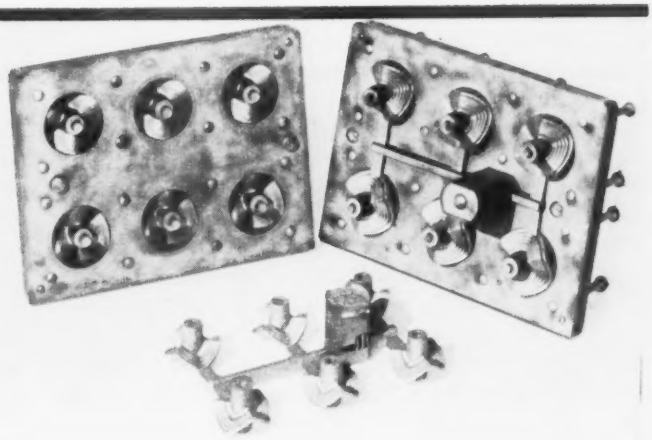


Fig. 11—Shell molding reduced final part cost of cam to a small fraction of what it had been

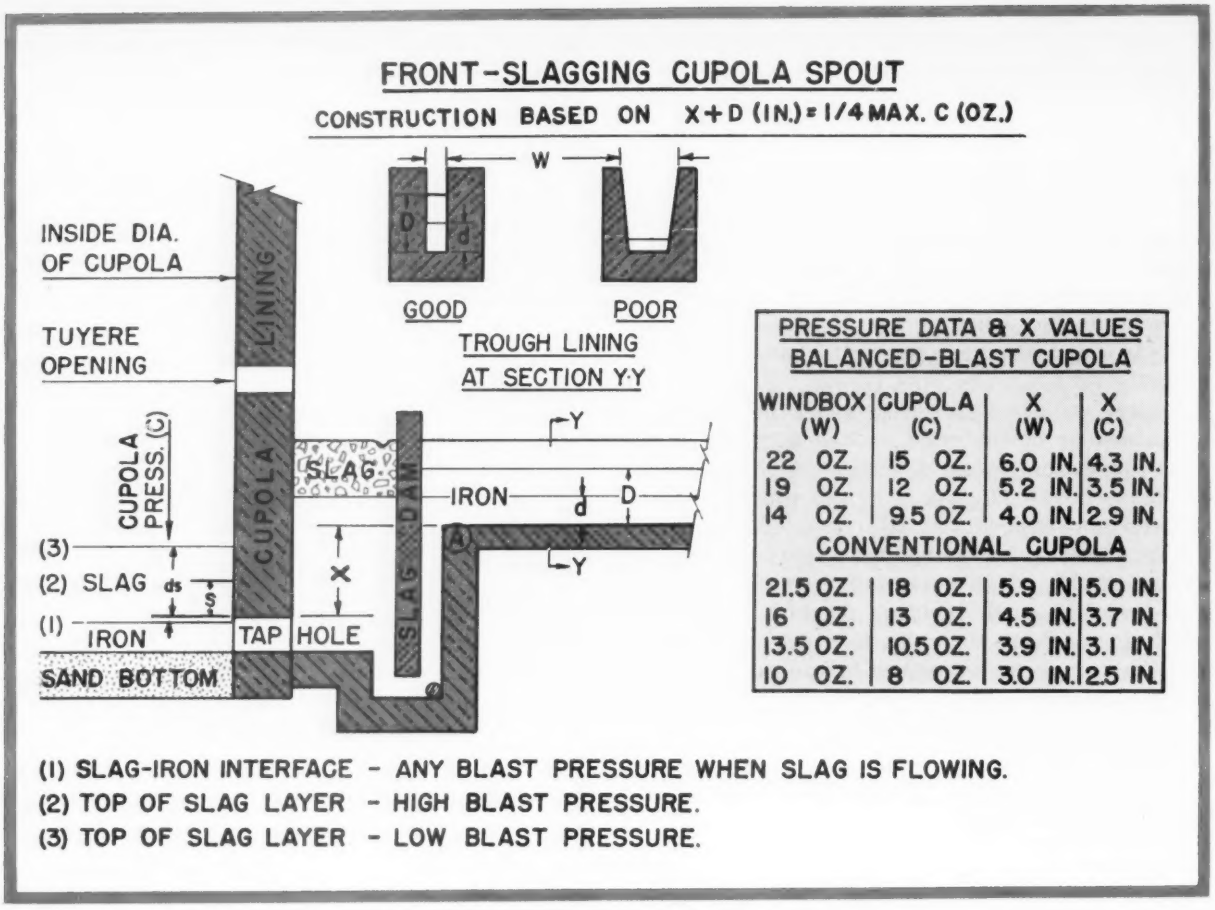

FRONT-SLAGGING CUPOLA SPOUT
CONSTRUCTION BASED ON X+D (IN.)=1/4 MAX. C (OZ.)
W
D
d
GOOD
POOR
TROUGH LINING
AT SECTION Y-Y
INSIDE DIA. OF CUPOLA
TUYERE OPENING
LINING
CUPOLA
CUPOLA PRESS. (C)
SLAG
IRON
SLAG DAM
TAP HOLE
SAND BOTTOM
(3)
(2) SLAG
(1) IRON
ds
S
X
Y
A
PRESSURE DATA & X VALUES
BALANCED-BLAST CUPOLA
WINDBOX (W) | CUPOLA (C) | X (W) | X (C)
22 OZ. | 15 OZ. | 6.0 IN. | 4.3 IN.
19 OZ. | 12 OZ. | 5.2 IN. | 3.5 IN.
14 OZ. | 9.5 OZ. | 4.0 IN. | 2.9 IN.
CONVENTIONAL CUPOLA
21.5 OZ. | 18 OZ. | 5.9 IN. | 5.0 IN.
16 OZ. | 13 OZ. | 4.5 IN. | 3.7 IN.
13.5 OZ. | 10.5 OZ. | 3.9 IN. | 3.1 IN.
10 OZ. | 8 OZ. | 3.0 IN. | 2.5 IN.
(1) SLAG-IRON INTERFACE - ANY BLAST PRESSURE WHEN SLAG IS FLOWING.
(2) TOP OF SLAG LAYER - HIGH BLAST PRESSURE.
(3) TOP OF SLAG LAYER - LOW BLAST PRESSURE.

Fig. 1—Schematic drawing shows the construction of a front-slagging spout

Front-Slagging Cupolas

This article describing the advantages of front-slagging cupolas is reprinted from *Pig Iron Rough Notes,* published by United States Pipe & Foundry Co., Birmingham

By W. W. LEVI
Chief Metallurgist
Lynchburg Foundry Co.
Radford, Va.

DURING the past few years, there has been a growing interest in front-slagging cupolas. With this arrangement, iron and slag flow from the cupola simultaneously through the same hole, thus eliminating the conventional slag hole used with intermittent tapping.

Before any operator can consider front slagging, the cupola must be checked to see that the tuyeres are high enough above the sand bottom so that when the air supply is reduced or shut off during the course of the heat, the metal which backs into the cupola does not raise the slag level inside to a height where slag will run into the tuyeres. Furthermore, there may be a greater accumulation of slag inside when operating at low blast pressures than when operating at high blast pressures and provision must be made for the storage of this relatively large amount of slag.

Fig. 1 is a schematic drawing showing the construction of a front-slagging spout with a series of horizontal lines showing levels of both slag and iron inside and outside the cupola under various operating conditions. A brief study of the drawing will indicate that the principle of the front-slagging spout is that of a simple U-tube in which the air pressure inside the cupola plus the downward pressure of molten slag inside the cupola are balanced against a head of molten iron outside the cupola.

In constructing the spout, the required head of metal is provided by installing the refractories so that location A is above the top of the tap hole a distance designated as X. Starting from location A (highest point in the trough on side of slag dam

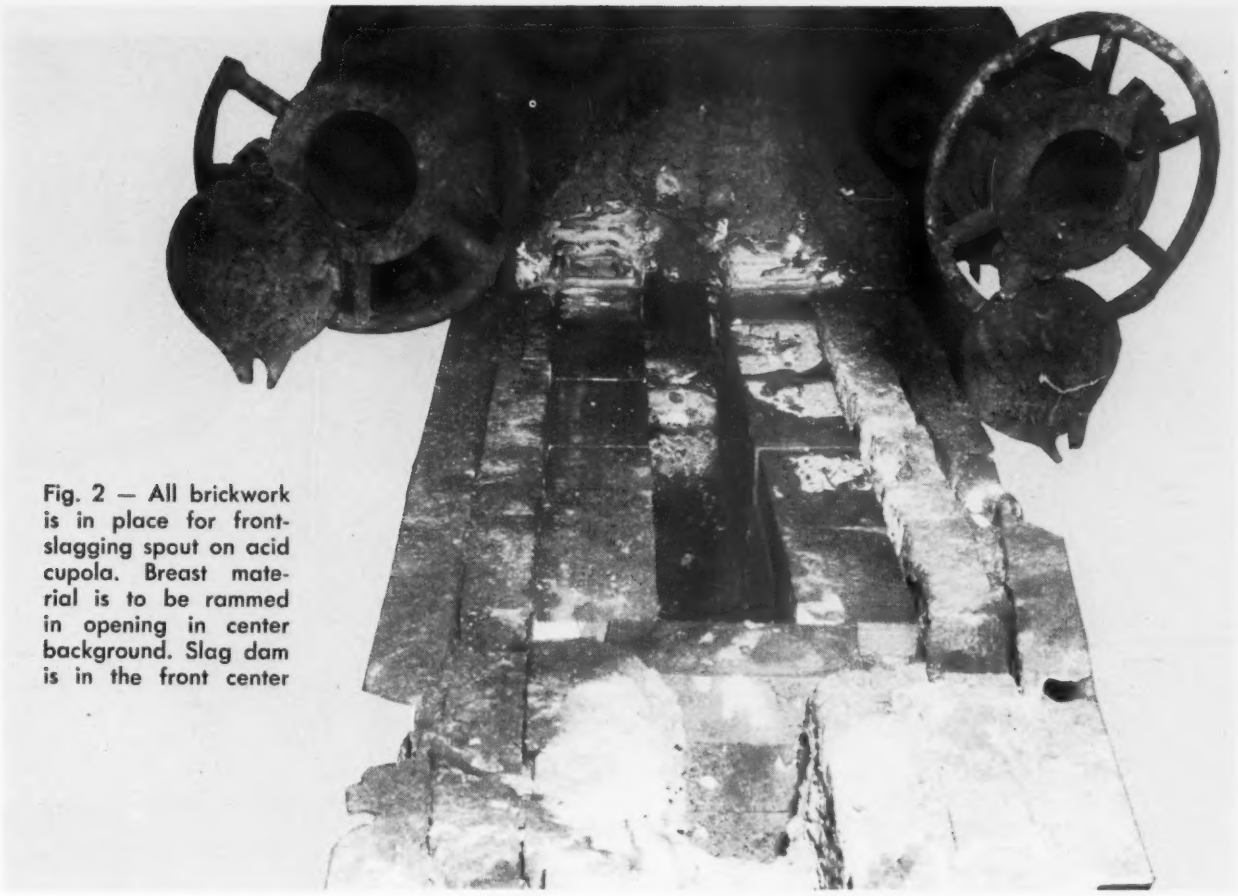


Fig. 2 — All brickwork is in place for front-slagging spout on acid cupola. Breast material is to be rammed in opening in center background. Slag dam is in the front center

away from cupola), the bottom of the trough should be level for a distance of about 4 or 5 in., and dimension X should be kept as small as possible for reasons given later in this discussion.

In actual practice, it has been found that the "ideal" front-slagging spout would be designed so that:

1. Slag would start flowing from the cupola at the beginning of the heat no more than 20 minutes after tapping out.
2. The cupola can be operated satisfactorily over its entire range of melting rates without an unduly large accumulation of slag inside when melting slowly and without leakage or "blowing" of air through the tap hole when melting rapidly.
3. There will be a minimum accumulation of slag inside the cupola regardless of melting rate.

Based on the foregoing, the following Equation 1 can be written for conditions representing maximum air pressure inside the cupola:

X + D (in.) = $\frac{1}{4}$ Max C (oz) + $\frac{1}{3}$ S (in.), where

X is vertical distance in inches from top of tap hole to point A;

D is maximum depth in inches of metal flowing over point A;

C is air pressure in ounces inside cupola. This is *not* the same as windbox pressure. It has been determined experimentally that the pressure inside the cupola is always less than windbox pressure and consequently, the windbox pressure readings can be used only for rough approximations of X. Some of these differences in windbox pressure and actual pressure inside the cupola are shown in connection with Fig. 1 in the tabulation of "Pressure Data & X Valves." The data were obtained in connection with both 72-in. balanced-blast and 72-in. conventional type cupolas. The column headed "Windbox (W)" indicates actual windbox pressure in ounces, and the column headed "Cupola (C)" indicates the corresponding wind pressure in ounces inside the cupola. Columns headed "X(W)" and "X(C)" show calculated values of X based on windbox pressures and actual pressures inside the cupola, respectively. From the above, it is evident that if windbox pressure readings are used in the equation, the calculated value of X will always be greater than needed in actual practice.

S is depth in inches above the top of the tap hole of layer of molten slag inside the cupola.

Iron weighs 0.26 lb per cu in. and, therefore, a head of 1 in. of iron will about balance 4 oz (0.25 lb) of air pressure.

Molten slag weighs about one-third as much as iron and, therefore, a head of 1 in. of iron will about balance 3 in. of head of slag.

Attention again is called to the fact that Equation 1 above represents a condition corresponding to the maximum cupola air pressure for which the spout is designed. The slightest increase in pressure beyond the maximum would result in leakage of air through the tap hole, which indicates that at maximum pressure the depth of the slag layer (S) is

Fig. 3—Front-slagging spout on basic cupola, under construction. Slag dam 6 x 15 x 18 in. is solid block of carbon which resists almost all basic slag

approaching zero. This being the case, the term (⅓ S) in Equation 1 can be dropped and the equation re-written as Equation 2:

X + D (in.) = ¼ Max C (oz)

In Fig. 1, the depth of iron flowing over point A has been indicated as "d" under conditions of slow melting, and as D when melting at a high rate. By keeping the passage for iron in the trough narrow at section Y-Y in the manner labeled "Good," the depth of molten iron at location A will be affected appreciably by variations in melting rate. The depth will be proportional to both melting rate and cupola pressure and can be made to provide a fully compensating and automatic balance for pressure changes inside the cupola.

To accomplish this, the width of the channel, dimension W, in section Y-Y would have to be such that for every increase or decrease of 4 oz in cupola air presure (C in Equation 2), there would be a corresponding increase or decrease of 1 in. in metal depth at point A. Actually it would be wise to make W a little greater than the minimum needed to fully compensate for pressure changes, because it is conceivable that an increase in melting rate resulting from an accidental improvement in coke ratio (with no change in air rate) might stop the flow of slag from the cupola.

For existing cupolas with front-slagging spouts, values for D and C in Equation 2 can be determined experimentally over the range of melting rates and air pressures used. Based on the data obtained, gradual changes can be made in X and W in Fig. 1 until an almost ideal design for the front-slagging spout is developed for any particular cupola operation.

For new and untried installations, the procedure for determining X as described by T. W. Curry, director of manufacturing research, Lynchburg Foundry Co., has been found to be very satisfactory. The highest operating pressure expected during the heat is used as a basis for determining the distance from the top of the tap hole to the bottom of the trough at point A. This distance, in inches, should be somewhat less than one-fourth the expected windbox pressure. The height of the dam calculated and set in this manner in all probability will be high enough to prevent "blowing", but may be too high to allow slag to discharge through the tap hole. It is well to keep the spout construction at point A in the form of a 4-in. ridge across the spout in case adjustments are necessary.

After the cupola is tapped, slag should appear on the surface of the metal in front of the tap hole in a maximum of 20 minutes of elapsed time from the first tap. If no slag appears, the height of dam is lowered about ¼-in. and time is allowed for the liquids to establish themselves at the new level created. This procedure is repeated until slag does appear on the slag spout. No further adjustment need be made if the slag will discharge from the cupola in sufficient volume to run over the slag spout in about 10 minutes after it makes its first appearance.

This, then, establishes a working height of the dam and it should be measured carefully from some fixed point on the spout frame. The new, adjusted height becomes the height of the dam, as previously described, for the next day's heat. Adjust-

Fig. 4—Opening through which iron flows under dam is in the foreground, left of center

ments on the second heat may be necessary again and, if any are required, the new height is measured from the same fixed spot. This procedure is repeated on subsequent heats, or until an average height is obtained which will allow the cupola to begin slagging in not more than 20 minutes, and will efficiently seal the tap hole from "blowing."

Experience gained in using the front-slagging spout naturally would allow the proper height at point A to be determined quickly and efficiently. On a new spout, this generally can be done in three consecutive heats by making one small adjustment at the beginning of each. It would be expected that one inexperienced in the use of the front-slagging spout perhaps would require more than three heats to establish the proper height, but it need not interfere with the melting efficiency in any way during this experimental work. Usually the adjustments described do not require more than one hour's time after the first tap is made. The dam height established in this manner is more versatile and efficient than any calculated setting.

With front-slagging, no definite relationship need exist between the melting rate of the cupola and the size of the tap hole. For example, a 2-in. diam hole will serve satisfactorily whether the cupola is melting 5 or 25 tons per hour. The tap hole may be circular or rectangular in cross-section. With front-slagging, it is felt that the rectangular hole with the long dimension in the horizontal plane offers more resistance to the cutting action of the slag than does the round hole.

It has been definitely established in front-slagging cupolas that slag and iron flow through the tap hole in two separate layers with the slag on top and the iron toward the bottom as might be expected. From this, it becomes evident, for any given value of X, that the only way to increase the slag-carrying capacity of a rectangular tap hole is by increasing the width. This also increases the iron-carrying capacity. Increasing the height of the tap hole increases its iron-carrying capacity but leaves the slag-carrying capacity unchanged.

It is of utmost importance to select and properly install good refractories in the front-slagging spout. Once established, the dimension X must not vary more than ¼-in. during an entire heat. The top of the tap hole is subject to slag attack and the refractories at point A are subject to erosion by the iron. Failure of the refractories at either of these two points results in a decrease in distance X. This may allow leakage of air through the tap hole, making it necessary to reduce the air pressure or stop the operation for repairs.

Front-slagging cupolas possess many advantages over those tapped intermittently, including uniform carbon pick-up, which is one of the essentials of carbon control. Other advantages include hotter iron at the cupola spout, no need for a slag hole with the usual loss of air blast, and better housekeeping because no slag wool is generated. Furthermore, the occasional shutdowns generally necessary for repairing the slag hole can be avoided and the flow of metal from the cupola may be stopped by simply shutting off the blower, thus eliminating the need for "bots" in the breast hole. This not only makes a safer operation, but also it is practically impossible to run cupola slag into the pouring ladles, as frequently happens with intermittent tapping when the man tapping the cupola leaves the breast hole open a little too long or a bot accidentally comes out.

In addition to the advantages just mentioned, it is easier to produce low-carbon irons from front-slagging cupolas, because at no time after tapping out is there any appreciable accumulation of molten iron in the well and the small amount which does accumulate remains at a constant level since the metal flows out as fast as it is melted.

Fig. 5—On basic cupola, trough between taphole and slag dam is lined with rammed carbon paste. Slag running off can be seen in center front

SALES AND DISTRIBUTION For Month of *January, 1954*

DATE	INVOICE NUMBER	SOLD TO	TOTAL SALE	COPPER BASE ALLOY — WEIGHT	COPPER BASE ALLOY — AMOUNT	ALUMINUM BASE ALLOY — WEIGHT	ALUMINUM BASE ALLOY — AMOUNT	MISCELLANEOUS — DESCRIPTION	MISCELLANEOUS — AMOUNT
5	101	"B" Company	320.00	500	320.00				
7	102	"C" Company	206.25			275	206.25		
8	103	"B" Company	420.00	700	420.00				
11	104	"D" Company	572.00	200	172.00	500	400.00		
10	105	"C" Company	340.00			400	340.00		
10	106	"D" Company	434.00	650	359.00	100	75.00		
10	107	"E" Company	56.00	100	56.00				
11	108	"B" Company	100.00						
12	109								
12	110						300.00		
						25	20.00		
		"B" Company	512.00	800	512.00				
26		"H" Company	480.00			600	480.00		
30	121	"H" Company	520.00	1000	520.00				
30	122	"E" Company	56.00	100	56.00				
31	123	"B" Company	450.00	750	450.00				
		TOTALS	8,532.25	8,300 lbs.	5,071.00	4,200 lbs.	3,361.25		100.00

RETURNS AND ALLOWANCES

This same form may be used by changing the heading from Sales and Distribution to "Returns & Allowances."

Fig. 1—Suggested form shown above is for a record of sales and distribution

What Does a Casting Cost?

This article describes briefly the procedures set forth in the new revision of the Non-Ferrous Founders' Society cost manual, which suggests a proper accounting system for the use of small businesses

By URBAN F. VON ROSEN
Partner, Soloway & von Rosen
Certified Public Accountants
Cleveland

THE CLEVELAND CHAPTER of the Non-Ferrous Founders' Society recently held a cost clinic at Fenn College of that city. This clinic was considered necessary because of a conviction that the industry as a whole would benefit from improved cost records. Another reason for the clinic was a second revision of the NFS cost manual, originally published in 1945 and revised in 1947. The society's national cost committee spent three years in research and in revision of the manual which was published recently.

It has been apparent for some time that an easily installed and maintained cost routine was needed most by small businesses since 54 per cent of the nonferrous foundries have less than ten employees. Accordingly, procedures set forth in the new cost manual have been made as simple as possible. A brief description of these methods follows.

Chart of Cost Accounts—Prompt and accurate financial statements are essential to proper management. These statements preferably should be prepared at the close of each month, or at least at the end of each calendar quarter. The customary financial statements for a manufacturer are 1) balance sheet, 2) profit and loss statement, and 3) cost of sales statement. The balance sheet shows the financial condition at a specified time by listing the assets, liabilities and capital as at the close of business on that date. The profit and loss statement shows the income and expense for a period of time ended on the date of the balance sheet and usually shows the cost of sales as a single total. The cost of sales statement explains the

total shown on the profit and loss statement.

In double-entry bookkeeping two kinds of books are necessary: One type, called a journal, records transactions in chronological order. The other type, a ledger, classifies the effect of these transactions on financial condition and net income by means of accounts. From the balances of these accounts, the financial statements listed above are prepared.

Exactly what accounts should be kept is important since this determines the ease with which informative financial statements can be prepared. A list of the accounts to be kept on the ledger, arranged in the sequence in which they appear first on the balance sheet and then on the profit and loss statement, is called a chart of accounts and is indispensable to good financial and cost reporting. Each account should have a number to identify it and to serve as a means to distribute vendors' invoices and to establish the proper sequence for account balances on the financial statements.

In the chart of accounts, asset, liability and capital accounts should precede the cost accounts. The society's chart of cost accounts, which is a list of accounts dealing with cost of goods produced and sold, has been planned to meet the peculiar requirements of determining the cost of a nonferrous casting.

Four of these requirements are very important, and separate accounts should be provided covering: 1. Copper-base alloys and aluminum-base alloys in connection with purchases, sales and inventories, with further breakdown if desired. 2. Each type of manufacturing expense that can be charged to a particular production department such as metal, melting, molding, coremaking and cleaning. 3. Each classification of apportioned expenses or foundry overhead arranged according to the basis of apportionment. 4. Each class of selling and administrative expenses.

Melting cost, metal loss and shrinkage and the cost of metal constitute a large part of the total cost of a nonferrous casting. And since costs vary, depending upon whether brass, aluminum, magnesium or other metal is used, it is evident that the costs of each base alloy must be segregated.

One casting may require much molding time, while others require little, depending upon complexities of the pattern. Another casting may require several cores, while others may have no cores. A third may need more than average cleaning time. For these reasons expenses that apply

PAYROLL RECORD

Week Ending Jan. 8th

CLOCK NO.	EMPLOYEE	TOTAL HRS.	HRLY. RATE	TOTAL WAGES	DEDUCTIONS FICA	WITH. TAX	MISC. (INS.)	NET	DEPARTMENT	DISTRIBUTION DIRECT LABOR HRS.	DIRECT LABOR AMT.	INDIRECT LABOR HRS.	INDIRECT LABOR AMT.	MISCELLANEOUS HRS.	MISCELLANEOUS AMT.
1	R. Anderson	40	1.70	68.00	1.36	12.24	1.00	53.40	Melting	40	68.00				
2	T. Blake	40	2.00	80.00	1.60	14.40	1.00	63.00	Molding	40	80.00				
3	C. Carson	40	2.00	80.00	1.60	14.40	1.00	63.00	Molding	40	80.00				
4	A. Daniels	40	2.00	80.00	1.60	14.40	1.00	63.00	Core	40	80.00				
5	E. Edwards	40	1.60	64.00	1.28	11.52	1.00	50.20	Cl. - Shpg.	40	64.00				
6	B. Graham	40	1.50	60.00	1.20	10.80	1.00	47.00	Molding				60.00		
7	A. Hanson	40	1.50	60.00	1.20	10.80	1.00	47.00	Core				15.00		
									Cl. - Shpg.				45.00		
	R. Dudley (Clerk)	40	1.75	70.00	1.40	12.60	1.00	55.00	Office Sal.						70.00
	J. Doe (Owner & Mgr.)			140.00	2.80	25.20			Office Sal.						140.00
TOTALS				702.00	14.04	126.36	8.00	553.60		200	372.00		120.00		210.00

SUMMARY

Melting – Direct Labor	40	68.00		
Molding – Direct Labor	80	160.00		
Core – Direct Labor	40	80.00		
Cl. - Shpg. – Direct Labor	40	64.00		
Molding – Indirect Labor			60.00	
Core – Indirect Labor			15.00	
Cl. - Shpg. – Indirect Labor			45.00	
Office Salaries				210.00
TOTALS	200	372.00	120.00	210.00

JOB TIME CARD

Name _____ No. _____ Date _____ Approved _____

DIRECT LABOR Dept. Molding

ORDER NO.	PATTERN NO.	CUSTOMER	MOLDS	PCS. or CORES	HRS.	RATE	AMOUNT
101	365652	"B" Company	10		1		
305	562837	"C" Company	15		1½		
6286	M-2512	"A" Company	25		3		
6234	367258	"D" Company	10		1½		
7412	S-2532	"E" Company	6		1		
		(This space may also be used to record Direct Labor for making cores or cleaning castings. Enter the production under column "Pcs. or Cores" and indicate the Department in the space provided above.)					
				TOTAL	8	2.00	$16.00

INDIRECT LABOR

JOB DESCRIPTION	DEPT.	HRS.	RATE	AMOUNT
(Use this space for men working on Indirect Labor)				
TOTAL				

Fig. 2—Payroll record form like this is used to total employees' time for whole pay period

Fig. 3—Daily job-time card should be submitted by each employee. This is suggested form

directly to one of the producing departments must be kept separate. For the same reasons indirect manufacturing expenses or overhead items should be charged to accounts which will permit their accurate apportionment to each of the five production departments. Because selling expenses should not be included in the inventory valuation of unfinished castings, these expenses together with administrative expenses should be separately accumulated.

Wherever possible each expense should be classified by department as well as by type of expense. All departmental expense accounts, in addition to bearing a number indicating the type of expense, should carry one of the following labels to indicate the department: Metal, melting, molding, coremaking, cleaning or shipping. In smaller foundries cleaning and shipping often are combined.

Account sheets may be kept in an inexpensive loose-leaf ledger. Typing the account name and number at the top of each sheet improves the appearance of a manually kept ledger. Accounts for metal purchases, inventories and sales should use a form of ledger sheet on which debit, credit and balance columns are at the extreme right to give maximum explanation space. For these accounts the explanation space should be used to show pounds. The same design of ledger sheet should be used for fixed assets, capital stock, surplus and other accounts where a detailed explanation of each entry would be important.

Cost Records—The journals of any manufacturer usually consist of cash receipts and disbursements journals, a purchase journal or voucher register, a sales book and a general journal. Specially designed purchase and sales books are useful in nonferrous foundry accounting because each base alloy must be kept separate and expenses classified, where possible, by producing departments. The purchase book should provide for classifying metal purchases by type of alloy and expenses by department and account.

The sales book should show two columns for each type of base alloy shipped, one for the weight in pounds and the other for the sales value. An inventory sheet for each kind of metal purchased showing pounds and dollars of cost also is essential. This form can serve as a perpetual inventory record, or it can be used as a record of purchases and consumption by taking a physical inventory on the last day of each month. A suggested form of sales and distribution record is shown in Fig. 1.

A job time card should be submitted daily by each foundry employee. Its data are used to determine direct labor cost by jobs and indirect labor by departments. Each employee's time then is totaled for the whole pay period and entered on the payroll record. Fig. 3 shows a suggested job time card. A payroll record form is shown in Fig. 2.

The estimate sheet or job cost record, shown in Fig. 4, performs two important functions. In submitting sales quotations it serves as an estimate sheet. For this purpose carefully estimated production data and predetermined departmental overhead rates are used. They are based upon budgeted departmental expenses divided by estimated direct labor hours in each department. After the job is completed, the same form can be used to summarize actual job order costs.

Finding Departmental Costs—The chart of cost accounts and the cost records merely are means of arriving at casting costs. Foundry cost records show base alloys consumed by kinds, their cost and the number of pounds. The chart of cost accounts gives the direct expense of each production department (*Please turn to page* 140)

ESTIMATE SHEET
or
JOB COST RECORD

Date

Company "B" Company — Part No. 60825 — Quantity 2000

Pattern Equipment Matchplate — Pcs. Per Mold 6 — Wgt. Each .75 — Wgt. Per Mold 6

Core Equipment Aluminum corebox — Cores Per Box 4-Blower — Cores Per Casting 1

Metal Specified SAE 65 — Tests Req'd. Chemical Analysis & Physical Test

METAL COST Analysis	Percentage	Cost	Total Cost
Copper			
Tin			
Lead			
Zinc			
Ingot 88-10-2	100%	.3800	.3800
Deoxidizers			
Total			.3800
Plus 6 % Metal Loss & Skimkage			.0228
Total Metal Cost			.4028

DIRECT LABOR & OVERHEAD Department	Total	Units	Rate	Estimate	Actual
Melting: – Combined Rate	480	Lbs.	.0619	29.71	
Molding Direct Labor	8	Hrs.	2.00		
Molding Overhead		Hrs.	3.66		
Combined Rate	8	Hrs.	5.66	45.28	
Core Direct Labor	4.2	Hrs.	2.00		
Core Overhead		Hrs.	2.75		
Combined Rate	4.2	Hrs.	4.75	19.95	
Clng. & Ship. Direct Labor	3.2	Hrs.	1.60		
Clng. & Ship. Overhead		Hrs.	3.08		
Combined Rate	3.2	Hrs.	4.68	14.98	
Other Operations: –					
Heat Treating		Lbs.			
Impregnating		Lbs.			
Laboratory	480	Lbs.	.06	28.80	
Total Direct Labor & Overhead				138.72	
Cost Per Pound				.2890	
Scrap Allowance 10 %				.0289	
Total Conversion Cost				.3179	
Plus Metal Cost Per Pound				.4028	
Mfg. Cost Per Pound				.7207	
Profit %					
Selling Price Per Pound					
Selling Price Each (Wgt. ea. x S. Price)					
Additional Expense					
Machining – Each				.10	
Total					

DELIVERY REQUIREMENTS

Releases	Delivery Date
1000	Feb. 1
1000	Mar. 1
via truck	

MOLDING PRODUCTION DETAIL
80 molds per days
Estimated scrap 10%

CORE PRODUCTION DETAIL
40 boxes, or 160 cores per hr.
640 ÷ 160 = 4. hrs.
Plus 5% breakage .2 hrs.
Total 4.2 hrs.

CLNG. & SHIP. PROD. DETAIL
Remove gates, grind, clean and inspect 200 per hr.
640 ÷ 200 = 3.2 hrs.

ADDITIONAL OPERATIONS
Laboratory Costs per hour of 240 lbs. of castings. $14.40 or $.06 per lb.

COST OF PATTERNS, MACHINING, ETC.
(Include Outside Purchases)
Machining cost each plus
Handling Cost & Profit $ .10
New Pattern equipment plus
Handling & Profit
Quote separately $285.00

Fig. 4—This form serves two functions, as estimate sheet and as record of the job costs

The Future of Castings In the Automobile Industry

Use of cast metals for automotive parts faces a promising future, the author believes. Reasons for his views are outlined in this paper presented before both the recent Michigan Regional Foundry Conference and the annual meeting of the Foundry Equipment Manufacturers Association on Oct. 16

By JAMES H. SMITH
General Manager
Central Foundry Division
General Motors Corp., Saginaw, Mich.

IN A CONSIDERATION of "The Future of Castings in the Automobile Industry," it is logical to consider first the future of the automobile industry, at least as we feel about it at General Motors.

Last January, President Harlow H. Curtice announced that General Motors was undertaking an expansion program calling for capital expenditures of a billion dollars.

It was his profound belief, he stated, that the national economy would continue strong and healthy. That conviction was based on several things—on an increasing population and the demand that such an increase would bring for more housing, more schools, more highways, cars, hospitals and other goods of all kinds; on the impetus given capital investment through elimination of the excess profits tax; on a continued high level of employment, incomes and technological progress; and on consumer expenditures and lower taxes.

He expressed the belief that all the necessary ingredients for a healthy, vigorous economy were present then and would continue to be present throughout 1954 and well into 1955. I am sure we all hope it continues far into the future.

The national economy is strong and getting stronger. It has, with a minimum of dislocation, successfully negotiated the adjustment from a wartime footing to a peacetime basis. Some of the success can be attributed to administration efforts, and some of the success must be attributed to the faith of American businessmen like Mr. Curtice in the essential soundness of our economy.

Speaking more specifically, from the standpoint of the foundry industry, I know of no time when the future of the casting industry has been as promising as it is today. As a concrete example of our faith in the future it is estimated that by the middle of 1955 Central Foundry Division will have instituted new facilities, processes and methods at a cost exceeding several million dollars. This program has been undertaken since the January announcement of the billion-dollar expenditure. Other divisions of General Motors having foundries also are spending large amounts of money to expand their facilities to meet future demands.

We know, however, that improved facilities, methods and processes are not the sole factor in the success of a business. If the end product is not acceptable to the customer, these facilities will avail nothing. We must merit and maintain the confidence of our customers in order to continue a high level of economic activity. Their confidence in our ability to produce a satisfactory product is vital to the growth and expansion of our industry.

Time and again, it has been demonstrated that our customers favor castings over forgings, stampings and steel weldments, provided they can be produced to meet service and mechanical specifications at a competitive price. Not long ago, I talked to an executive vice president, reminiscing about the early days of the foundry industry, and he stated that he could remember a certain foundry that made a lot of molds, poured a lot of castings and made a lot of scrap, but, of course, had a lot of good castings left over. We know today that we cannot remain competitive with that type of operation. As in any business, competition becomes more keen each day, and every indication points to a continuation of this trend.

The foundryman must be ever alert to improved methods of producing castings, to new developments and to anything (*Please turn to page* 223)

Fig. 1—Operator has just made a sand mold on a squeezer machine

Fig. 2—Aluminum corebox is used in the production of a sand core

Fig. 3—Sand cores are placed in the mold with the greatest care

Things To Know About

Aluminum Sand Foundry Practice

In spite of the ease with which aluminum can be cast, high-quality castings can be produced only after careful study of aluminum foundry practice. The author describes the fundamentals of that practice

ALUMINUM is among the easiest metals to cast, but a great backlog of engineering know-how is required to produce a good aluminum casting. Careful study of aluminum foundry practice should precede actual casting operations.

General metal characteristics important to the foundry include the low specific gravity of aluminum alloys; the tendency for these alloys in the molten state to form oxides and dissolve hydrogen from the atmosphere; the relatively low melting and pouring temperatures used; and the manner in which these alloys respond to heat treatment.

Equally important to a successful aluminum foundry operation is an understanding of specific properties and characteristics of individual alloys. Knowledge of these factors is essential so that the foundryman can select or advise the proper alloy and heat treatment for a particular casting application before using the general foundry practice described in this article.

Melting and Handling Molten Aluminum—Aluminum alloys may be melted in reverberatory or open-hearth furnaces, crucible furnaces and electric induction furnaces. Open-hearth melting has been found suitable and economical for alloying large quantities of metal or for foundries producing

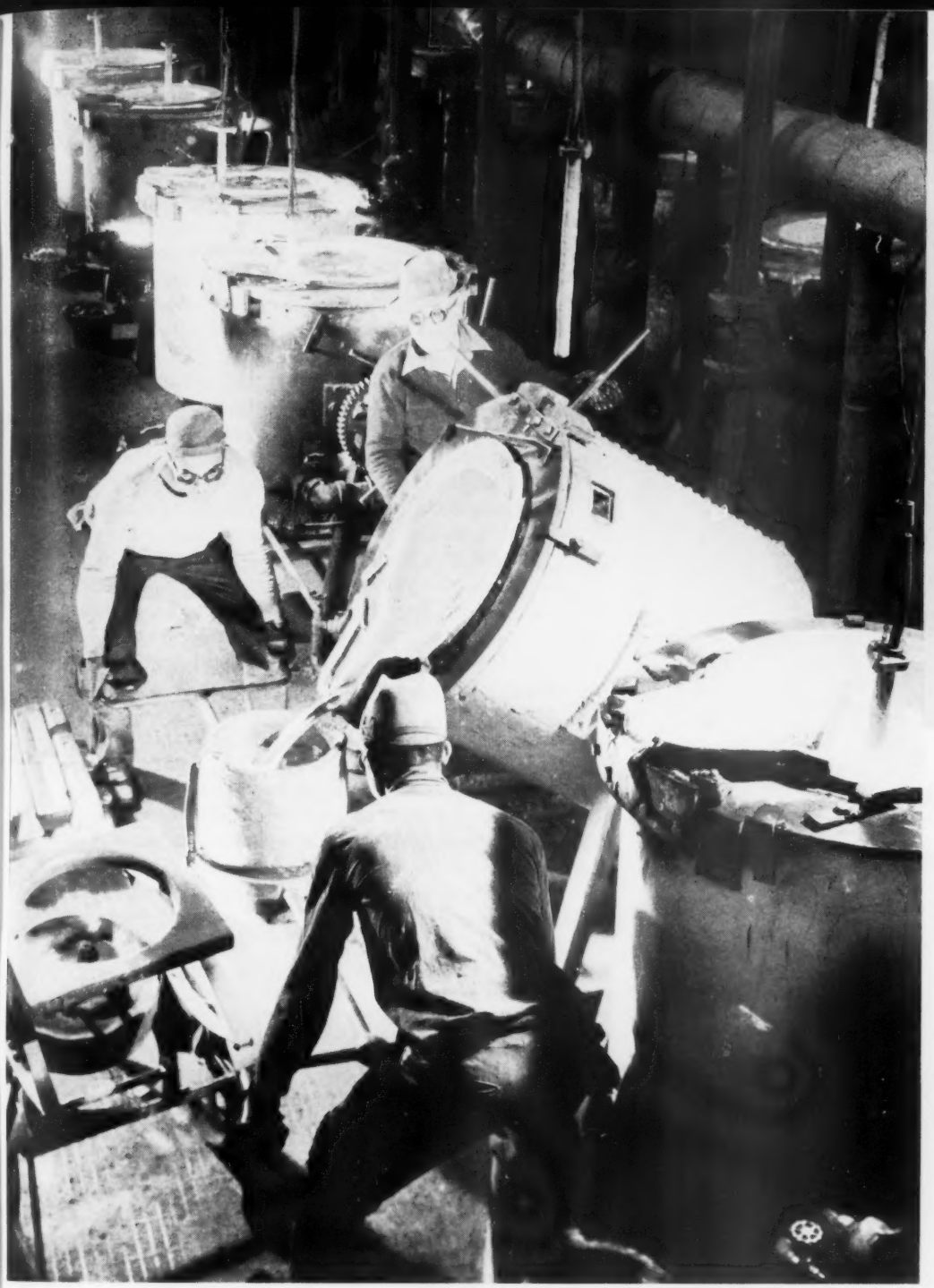


Fig. 4 — Melting metal for large castings in 400-lb, iron-pot furnaces. Suspended thermocouples are used in checking temperatures

By W. D. STEWART

Staff Metallurgist
Castings Division
Aluminum Co. of America

large quantities of similar parts. Since most foundries are concerned with production of a variety of parts using several alloys, smaller crucible type furnaces usually are preferred. These furnaces range in capacity from 100 to over 1000 lb of aluminum and may be oil or gas-fired. Some are tilting furnaces; others are the stationary, ladle-out type. Each has its own best field of application. The size best suited to any operation must be determined on the basis of economic factors, such as size and type of castings to be produced, total quantity to be melted, and metal transfer facilities available. Obviously, compromises may be necessary to achieve the best balance.

Crucibles for these furnaces usually are made from refractory materials such as graphite and silicon carbide or from cast iron. Cast iron crucibles have the advantage of better heat transfer to the melt, but they require frequent application of protective wash to minimize iron pickup. Since cleaning must precede the wash application, this whole operation is time-consuming and cumbersome. There is, moreover, the constant danger of iron pickup as the result of localized wash failure. For these reasons, refractory crucibles are particularly useful for melting the aluminum-silicon and alu-

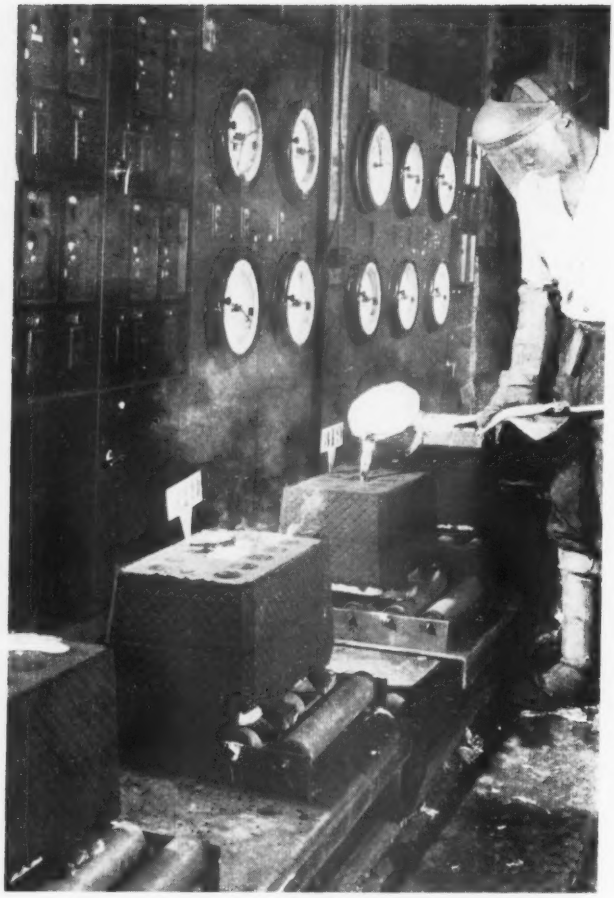


Fig. 5—Pouring squeezer-type molds on a loop conveyor in a small sand foundry. Temperature and metal control board located in background

minum-magnesium alloys, in which a minimum of iron pickup must be maintained to preserve mechanical properties and resistance to corrosion.

When aluminum is melted, careful consideration must be given to composition control. There is no problem when carefully identified, pre-analyzed ingot is used. Problems may arise, however, when foundry operating scrap is fed back into the melting furnace, particularly if a number of alloys are used in the foundry. Since aluminum alloys all look alike, careful segregation must be practiced.

If there is a question of scrap analysis, the metal should be cast into ingot and analyzed or, in foundries where facilities are not available for analysis, should be used back in one of the less critical alloys.

Electric induction furnaces may have advantages over other types of melting equipment for some applications. With them, the possibility of iron pickup is no problem, and refractories can be chosen without regard to their heat transfer properties. However, by the nature of the equipment, it is difficult to change alloys, and original cost of the equipment is much greater than that of other furnaces.

Consideration should be given to combining some of the melting techniques where the situation warrants. For instance, it might be feasible to use an open-hearth furnace to melt and adjust composition, then to transfer to a crucible furnace for temperature adjustment and degassing. Where this is practical from the quantity standpoint, real economies may result.

Fig. 6—Two-man shank ladle is used to pour green sand casting. Normally, the ladle should be held as close to the mold as possible to avoid turbulence, dross formation and the pickup of gas

Fig. 7—Gates and risers on aluminum castings can be removed readily with bandsaws like the model shown

Temperature control is important in maintaining melt quality. Because of the tendency of aluminum to absorb hydrogen and to combine with oxygen to form dross it is always better to minimize these tendencies through good control at every step than to try to clean up the metal after it has been damaged. Both tendencies are increased by prolonged exposure to moist atmospheres or to the combustion products of gas or oil-fired furnaces. Hydrogen pickup is particularly rapid when moisture is introduced under the surface of the melt as by moist tools or inadequately preheated metal additions. All of these things become more serious as the temperature is increased.

The temperature of molten aluminum in the operating ranges cannot be judged accurately by eye. It is necessary, therefore, to use some temperature indicating device. Most widely used is the thermocouple with a direct reading millivoltmeter or a potentiometer. For melting furnaces, the thermocouple should be shielded from molten aluminum. Most commonly, a cast iron protective sheath, adequately coated, is used. For best melting practices, a control instrument should be used to prevent accidental heating to excessively high temperatures.

As a generally good rule, the best pouring temperature is the lowest that will provide the fluidity and feeding characteristics required for the individual casting. Some practical compromise may be necessary, but that does not reduce the validity of the rule. High pouring temperatures tend to coarsen the grain, increase porosity and cause local shrinkage.

Fluxing—Fluxing practice should be considered as a supplement to good melting practice, not a substitute for it. Fluxes for aluminum alloys fall into two broad types: 1. Those designed to remove hydrogen dissolved in the metal; 2. Those designed to separate molten metal from oxide films and dross at the melt surface. Certain fluxes achieve both of these aims to some degree.

Historically, volatile chloride salts such as zinc chloride or aluminum chloride have been used for fluxing aluminum. The salts often are used as capsules (made by wrapping the salt in aluminum foil) submerged beneath the surface of the molten aluminum. At the melt temperature, the salts volatilize and bubble up through the metal. In the case of zinc chloride, there is some reaction imparting zinc to the aluminum. This action obviously is to be avoided with those alloys having low zinc tolerances. With both salts, a considerable volume of acrid fumes (*Please turn to page* 216)

Fig. 9—A batch of castings is being loaded into a heat treating furnace

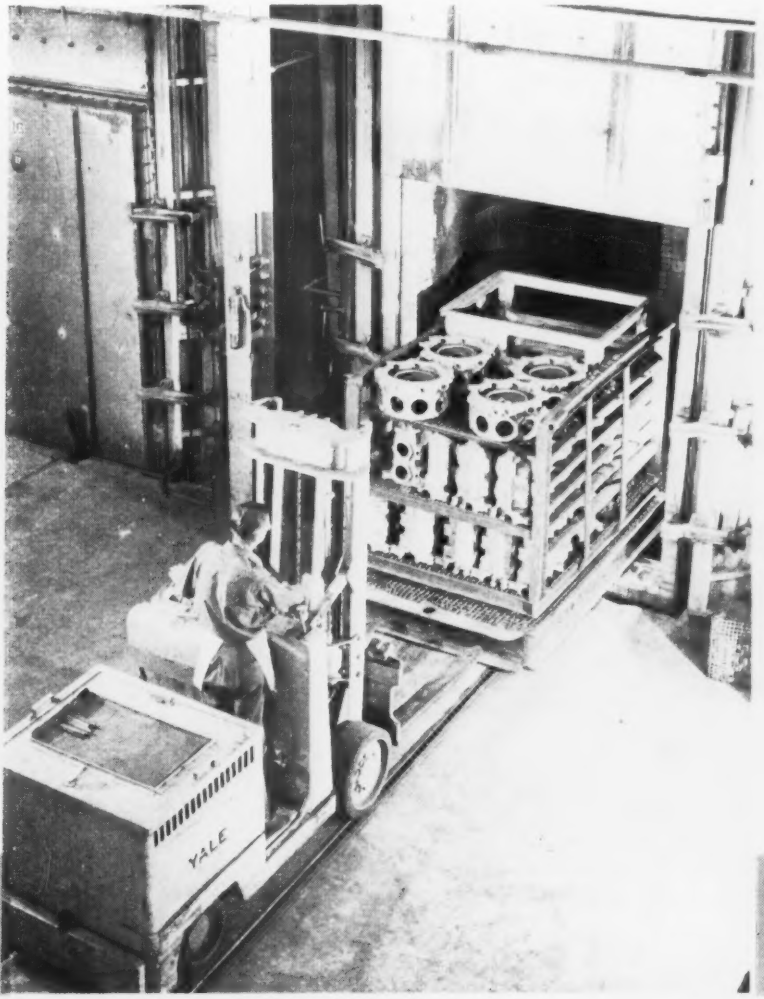


Fig. 8—Snagging, rough grinding and polishing are done on stationary or portable grinders with proper wheels

Hot Blast Systems

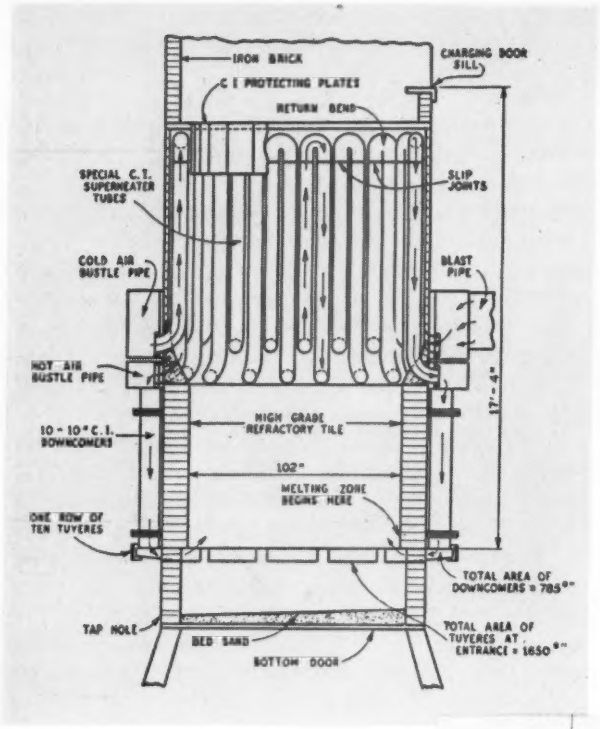


Fig. 1 (above)—Cross section of Moore hot blast cupola, in which only sensible heat of effluent gases preheated incoming blast

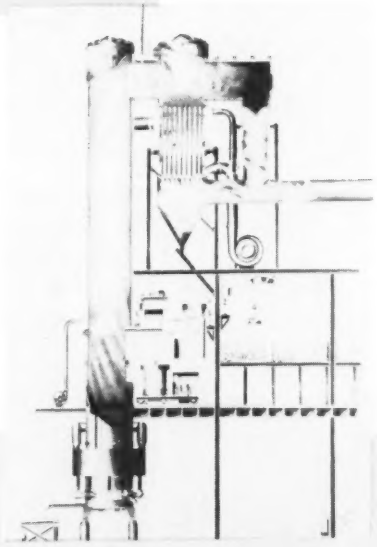
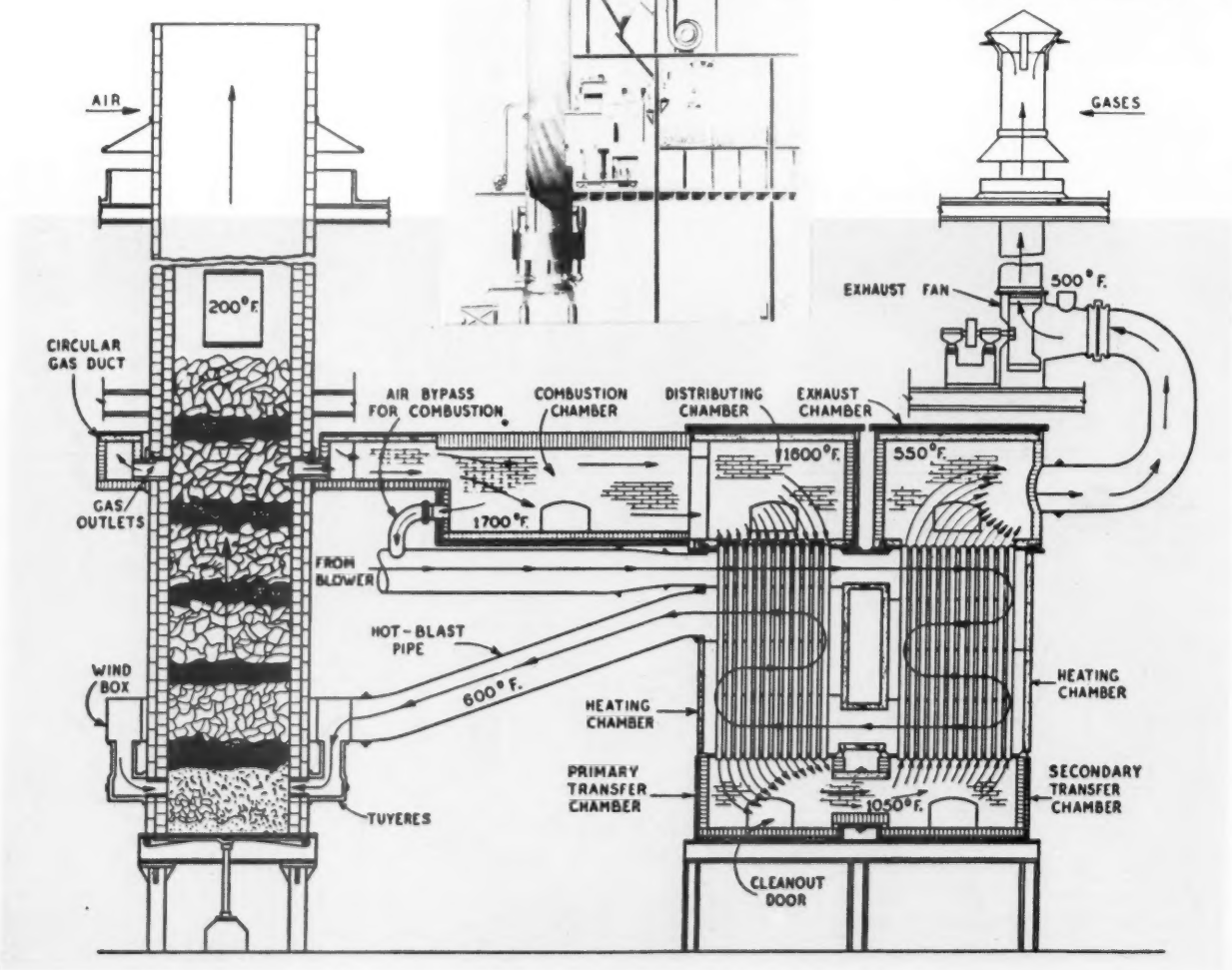


Fig. 2 (left)—The Grindle hot blast system is recuperative type, uses all effluent gases

Fig. 3 (below)—Griffin system utilizes both the sensible and latent effluent gases of cupola to preheat the incoming air



Preheating of cupola blast air is becoming a more common practice each year. Various systems are described in this paper presented at the recent Metals Casting Conference held at Purdue University

By GARNET P. PHILLIPS
General Supervisor, Foundry Research
International Harvester Co.
Chicago

PREHEATING of the cupola blast air is being done by more foundries each year. Similarly, the makes and types of air preheaters or "hot blast systems" are becoming more numerous.

Advantages—One of the greatest advantages of the hot blast system, and perhaps the main reason for installing a hot blast system, is the fuel saving which can be realized from its use. By preheating the incoming air to about 500° F, a 20 to 25 per cent reduction in coke consumption can be attained, with a corresponding reduction in limestone, but no drop in metal temperature. Other significant advantages include:

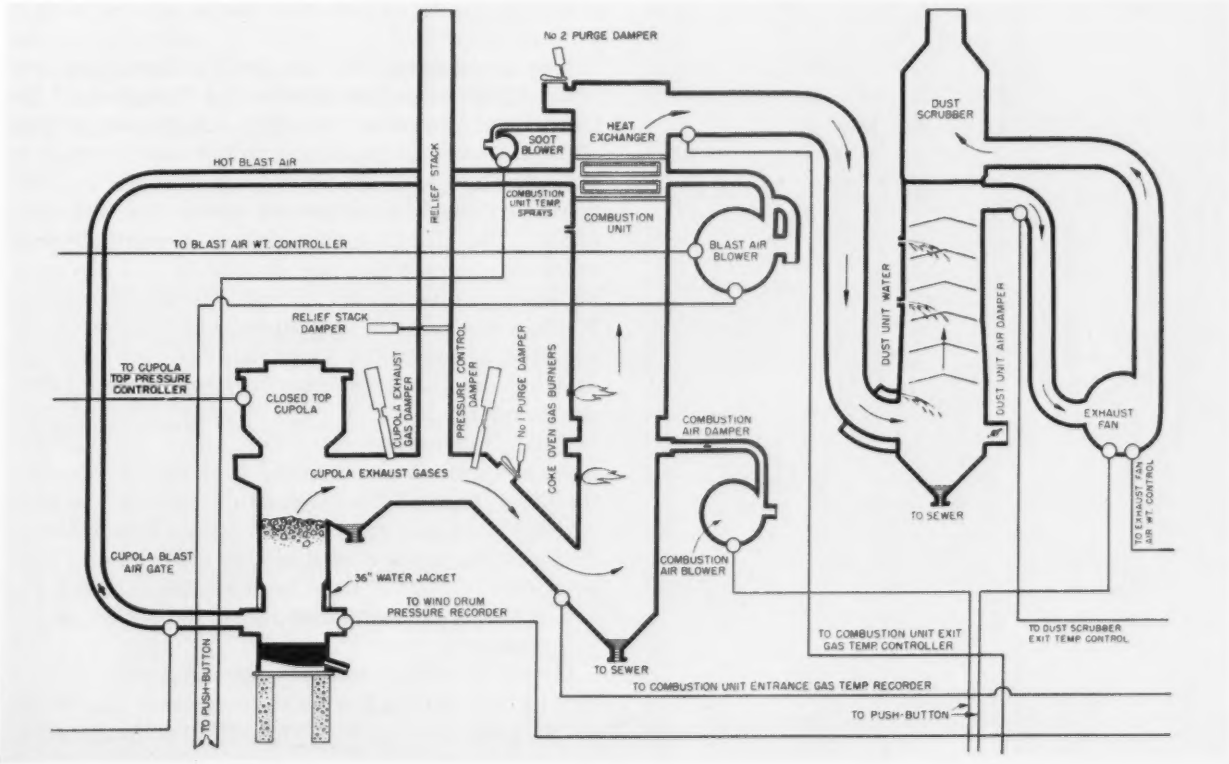
1. A reduction in refractory cost.
2. A lower sulphur pickup.
3. Less oxidation of silicon and manganese.
4. A more consistent and trouble-free cupola operation because chilling of the slag at the tuyeres with consequent bridging is practically eliminated.

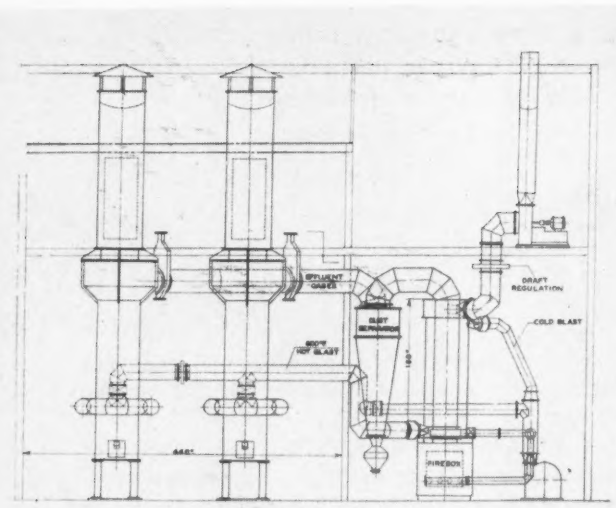
If faster melting or higher temperatures are needed than are being attained under cold blast conditions, a hot blast system is one way of accomplishing these objectives. Preheated blast temperatures of 750° to 800° F are now being used for increased fuel economy in some cases and in others to obtain metal temperatures over 2900° F at the cupola spout.

Types of Air Preheaters—Two basic types of hot blast systems are: 1. The recuperative type. 2. The externally fired type. The recuperative type uses the sensible heat of the cupola effluent gases or the sensible and latent heat of the effluent gases to preheat the incoming air. The externally fired type has an independent heater which is fired by coal, gas or oil to preheat the blast air.

Recuperative Hot Blast Systems—The Moore hot blast cupola, shown in Fig. 1, was originated by W. D. Moore, president of the American Cast Iron Pipe Co., Birmingham. Only the sensible heat of the effluent gases was used to preheat the incoming blast, and temperatures of 265° F to 330° F were attained. The illustration shows the arrangement of the incoming air pipes running down the inside of the cupola to the melting zone area where they transfer to the outside of the shell and into the tuyeres. This system has been replaced by an externally fired hot blast system.

Fig. 4—The Modern hot blast system is a recuperative type using all cupola waste gases





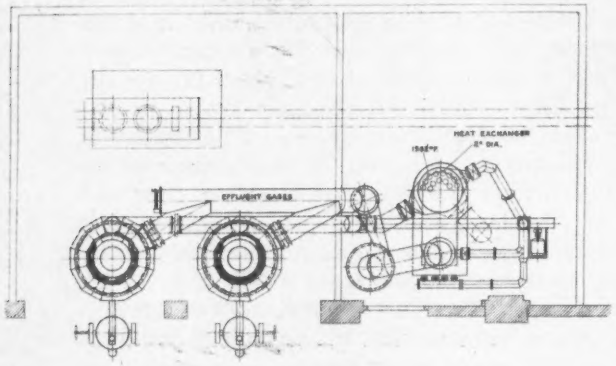
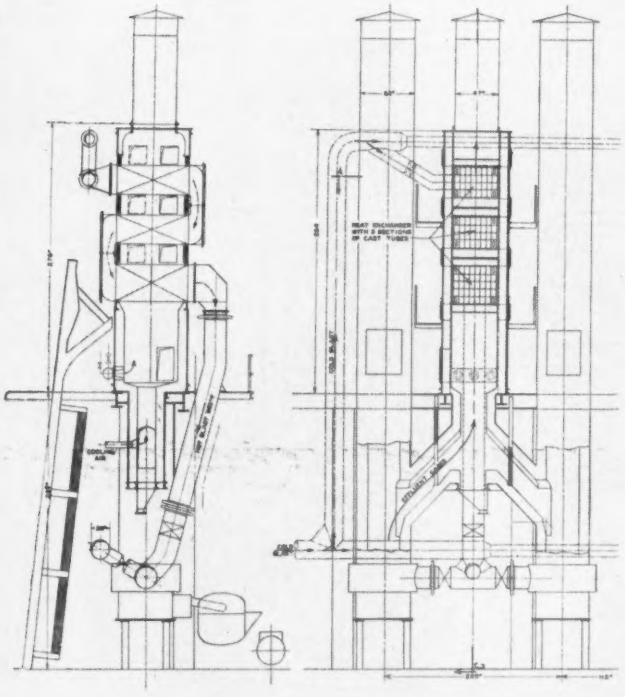


Fig. 5 (above)—Late-design Schack system also utilizes all the cupola gases

Fig. 6 (below)—Typical Economizer system, designed in Europe, like the Schack



The Griffin System—This system, shown in Fig. 3, utilizes both the sensible and latent heat of the cupola effluent gases to preheat the incoming air. It was developed by the Griffin Wheel Co., Chicago. There are many installations of the Griffin system in operation today including four in the International Harvester Co.

In most of the Griffin installations a portion (approximately 60 per cent) of the effluent gases are drawn into a refractory-lined combustion chamber through a series of ports located in the sidewall of the cupola just below the charging door. These gases are mixed with air and ignited by a pilot light or torch. The burning gases are drawn through tubes in two or more heat exchangers where the heat is given off to the tubes around which the air flows from the blower to the tuyeres.

Two, and in some cases, three heat exchangers are used. The illustration shows a two-stage heat exchanger with temperatures of about 1700° F in the combustion chamber, 1620° F at the top of the first bank of tubes, 1100° F between the first and second banks of tubes, 650° F at the end of the second bank and 600° at the exhaust fan. Temperature of the blast is limited to about 550° F to protect the heat exchanger tubes and tube sheets which are cast iron. This is done automatically by setting a control which actuates an air inlet door should the blast temperature get too high. Temperatures in the combustion chamber, in each bank of heat exchangers, at the exhaust fan and of the incoming air at the windbox are continuously recorded.

Must Keep Tubes Clean

It requires from 30 minutes to one hour after the blast is turned on to come up to temperature. Daily blowing of the tubes after the heat should be done if thermal efficiency is to be maintained. Brushing the tubes and tube sheets once a week is very necessary.

New installations of the Griffin hot blast system include one at Manufacturing Research of International Harvester Co. This installation utilizes all of the exhaust gases as the top of the cupola is capped. The gases are drawn off through a single refractory-lined duct located above the charging doors. The charging door area is a vestibule with swinging doors which are opened by the charging bucket as it is moved in and out of the cupola. Torches are located immediately above the charging door to ignite the gases. Air for combustion is drawn from the crane opening immediately above the charging doors.

With this arrangement the upper part of the cupola is used as a part of the combustion chamber, the other part of the combustion chamber being a vertical stack adjacent to the cupola. Two banks of heat exchangers are used in this installation. Temperatures of 700° F have been attained toward the end of two-hour heats, and higher temperatures are expected.

Complete safety controls are incorporated into each of the Griffin hot blast systems so that if one of the parts, such as the exhaust fan fails, the other

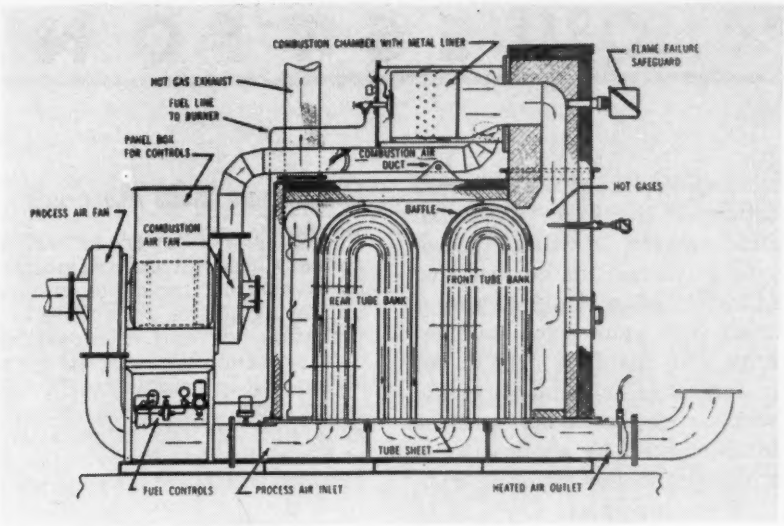


Fig. 7—Todd Thermo hot blast does not use the cupola exhaust gases to preheat the blast air

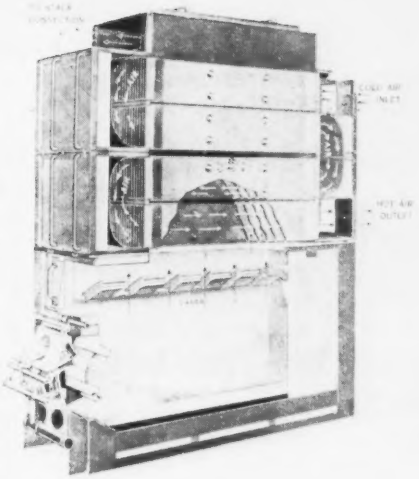


Fig. 8—In Ross system temperature of the blast desired determines number of heating units used

parts, including the cupola blower, are automatically stopped.

Modern System—The Modern hot blast system, made by the Modern Equipment Co., Port Washington, Wis., is a recuperative type which utilizes all of the cupola waste gases, as shown in Fig. 4. Sliding doors seal the top of the cupola except when a charge is dropped, at which time the charging bucket, having a lid on top of it, is nested in a water trough to seal the cupola.

The effluent gases are mixed with air and ignited in a combustion chamber. A single pass heat exchanger employing 13 per cent chrome steel tubes transfers the heat to the incoming blast air. In the Modern system the effluent gases are circulated around the tubes instead of through them and the tubes are cleaned by a soot blowing system which puffs air at 125 psi pressure at one minute intervals.

The operating preheated blast temperature of 500° to 600° F is reached within one-half hour. Combustion chamber temperatures run in the range of 1600° F to 1700° F and the temperature at the exhaust fan is claimed to be about 140° F when the Schneible wet type collector is used.

Safety interlocking electrical controls guard the equipment from chances of explosion.

Grindle System—The Grindle hot blast system, shown in Fig. 2, is produced by the Grindle Corp., Harvey, Ill. It is a recuperative type which utilizes all of the effluent gases from the cupola. The waste gases are drawn from the top of the stack downward through a vertical combustion chamber and heat exchanger. The portion of the cupola above the charging doors to the draw-off duct is also used as part of the combustion chamber. A single pass heat exchanger is used to transfer the heat from the effluent gases to the incoming blast air. The gases are drawn through the tubes and the incoming blast air is circulated around them. The tubes are alloy steel, 3 in. in diameter and 18 ft long. The air is preheated to 500° F to 600° F.

Foreign Systems—Schack, of Dusseldorf, Germany, has designed and installed recuperative hot blast systems in Europe. One of the first recuperative types designed by Schack utilized about 80 per cent of the effluent gases from cupola. These gases were drawn off (*Please turn to page* 211)

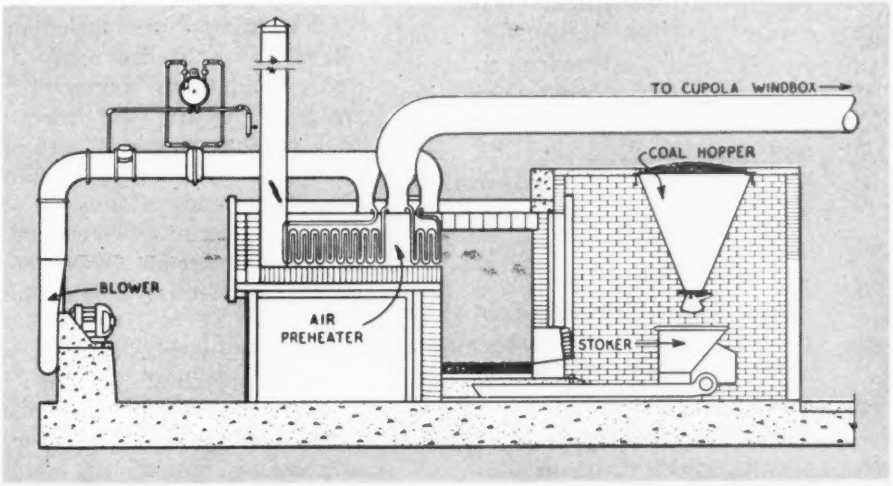


Fig. 9—Whiting hot blast system is an externally fired type. Coal, hand shoveled or stoker fed, pulverized coal, oil or gas can be used for fuel

QUESTIONS

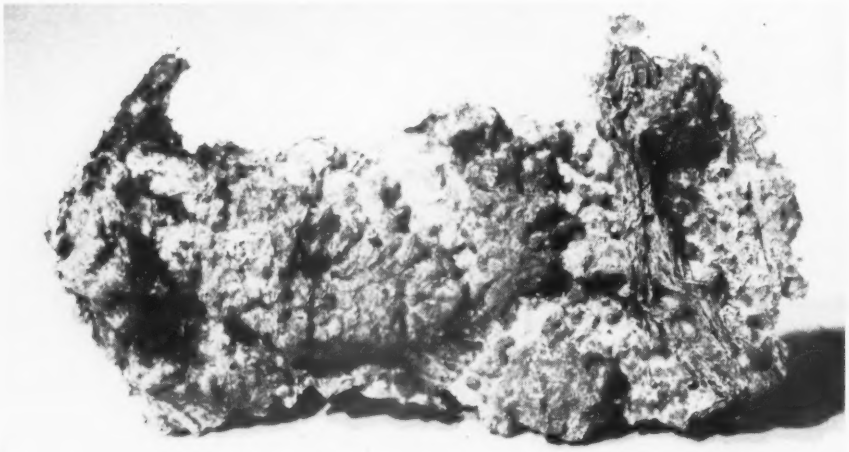
Rusty areas are caused by iron segregation . . . . .

Moldable exothermics . . . . . Slush molding

Soft rammed core . . . . . Holes in casting

Propellers Show Rusty Areas

QUESTION We are receiving many complaints about our propellers developing rust spots on their surfaces after being in service, and as a result are losing sales and customers. We are using No. 421 manganese bronze ingot only, and it is melted in crucibles in gas-fired furnaces. There is no possible source of contamination with iron from any operation we do in handling it. We are sending along a piece of the runner, and the skull which adheres to the ladle after pouring. This particular piece was thrown outside where it weathered. You will note the rusty area is extensive, and our propellers look like this after being in use. We have considered using No. 420 manganese bronze as we would like to maintain an elongation of at least 27 per cent in 2 in. in all propellers we produce. Tensile strength of this alloy is sufficient, and we note the elongation is higher than for No. 421.



Dark areas shown on skull indicate how rust appears on propellers

ANSWER Your trouble with the manganese bronze propellers is segregation of an iron-rich constituent. This is the result of improper alloying wherein some of the iron is not dissolved when the bronze ingots are made or is due to melting conditions which permit oxidation of the iron. With two possible sources, it will be necessary to determine the correct one, and the first step would be to get in touch with your ingot supplier. Perhaps you might be able to get some indication in that direction by weathering the ingots; process could be speeded by application of a strong ammonium chloride solution. If the ingots are found to be all right, then examine your melting procedure.

According to our information, the No. 421 alloy is similar to Navy 49B3f, SAE 43, and Federal B 726c (A) calling for 55 to 60 per cent Cu, 1 per cent max Sn, 0.4 to 2 per cent Fe, 0.5 to 1.5 per cent Al, and 1.5 per cent max Mn, with minimums of 65,000 psi and 20 per cent elongation. It is commonly used for propellers. The No. 420 alloy corresponds to alloy A in ASTM B 132-52 specifying 56.0 to 62.0 per cent Cu, 1.5 per cent max Sn, 1.5 per cent max Mn, 1.5 per cent max Al, and 2.0 per cent max Fe, with minimums of 60,000 psi tensile strength and 15 per cent elongation.

It appears to us that this alloy being lower in zinc would not be as stiff as the other higher tensile strength alloy, and might tend to whip where thin sections or high speeds would be involved.

Exothermic Mold Materials

QUESTION We operate an iron foundry in Spain and are interested in exothermic moldable materials, but owing to the difficulties of importation, we find it impossible to obtain them. We will be grateful if you will inform us how we could make such materials ourselves, supplying all the information as well as the details and standards practiced in their employment.

ANSWER It is our impression that the exothermic moldable materials on the market are patented, and it may be well to look into that situation before proceeding. These materials depend upon the well known "thermit" reaction between metallic aluminum and oxidizing agents to supply the heat. They are combined with irreducible refractory oxides and a binding agent to form the moldable material. For example, one patent shows about 77 per cent aluminum oxide, 2 per cent potassium nitrate, 4 per cent sodium nitrate, 4.5 per cent iron oxide, 2.5 per cent aluminum and 8 per cent refractory or cereal binder.

Slush Casting of Aluminum

QUESTION We are interested in obtaining any information relating to slush casting of aluminum alloys. This would cover method of casting, types of aluminum alloys used, melting methods, types of molds used, etc.

ANSWER So far as we know, the only descriptive material on the slush molding process for aluminum alloys was published many years ago. It related to manufacture of teakettle spouts, but mentioned that the method also was being used for production of hollow chandelier and ornamental castings. Indications were that 99 per cent aluminum as well as any of the commercial alloys could be used.

However, nature of the process suggests use of alloys which have a short freezing or solidification range—for example, the 5 per cent silicon alloy, which has a solidifica-

tion range of about 95° F, compared with 170° for the 7 per cent copper-1 per cent zinc alloy.

Molds for slush casting aluminum are made of cast iron. Usually they are the two-part type split longitudinally, although they may be multi-piece. They are equipped with handles and mounted on trunnions so that they can be tilted for filling and dumping or "slushing"—as it usually is termed. Extensions are provided on each end of the mold cavity to insure proper filling.

Filling or gate end generally is arranged in a gentle arc or slope. In pouring, this end is turned so it is the lowest point of the setup. As the operator pours metal into the gate from a small dip ladle with one hand he gradually turns the mold upward with the other to permit the metal to enter the cavity slowly and gently. Metal is allowed to remain in the mold until the walls reach the desired thickness. Then the gate end is turned down to empty or "slush" the remaining liquid metal into the ladle. Metal is returned to the melting furnace.

Wall thickness of the casting is controlled by mold temperature, metal temperature, rate of filling, and the holding time before dumping or slushing. Molds usually are heated at the beginning of operations by pouring a number of "dummy" castings until such time as they are free from cold shuts. Mold operating temperature may be controlled by the rate of operation of the molds or by immersing the mold in a tank of water from time to time.

Melting procedure is the same as practiced for other molding methods. In some cases where a number of operators are engaged, it may be more convenient to melt a large quantity of metal in one furnace and distribute it from time to time to smaller holding furnaces with automatic temperature control, located at the operators' benches. It should be pointed out that while the exterior surface of a slush molded casting will be smooth, the interior will tend to be rough.

Core May Be Rammed Too Soft

QUESTION We are sending along for your examination a portion of an 80-10-10 bushing with which we are having trouble. It is 7 in. OD with a ¾-in. wall, and 8 in. high. It is gated from the bottom with two risers at the top. Pouring temperature is 1950° F. Core has a ½-in. vent through the center, painted with a core wash and dried in the oven. Core mix is composed of 15 gallons of sharp sand, 5 gallons bank sand, 1½ quarts cereal, 2½ pounds iron oxide and 1½ quarts oil. As you can see, the defects are the small holes just under the inner surface, and fissuring which occurs from top to bottom of the casting.

Fissuring or whiskering occurs from top to bottom of the bushing

ANSWER It appears to us that your difficulty is due to soft ramming of the core. The core is a large chunk, and the coremaker probably resorted to soft ramming to avoid trouble from blows and to promote collapsibility. We believe you can solve your problem by employing a shell core about 1 in. thick instead of a solid core. It would not take much longer to make, would require less sand, be considerably lighter in weight, and bake much faster.

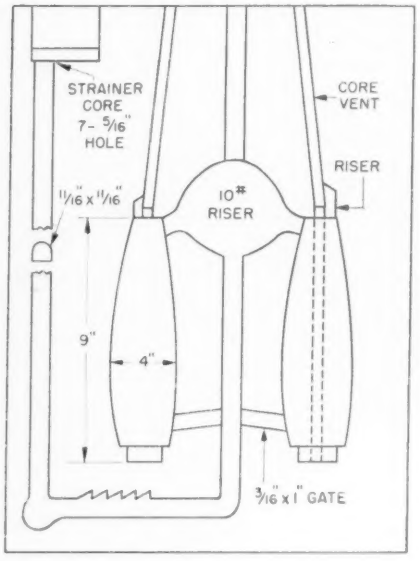
It also may be worth while to simplify the core mix as much as possible. Why not try practically all sharp sand with just sufficient cereal or bank sand to give the desired green strength plus the core oil to give a ratio of 1 part oil to 80 parts sand by volume?

Holes in Shell Mold Casting

QUESTION We are enclosing a drawing showing the gating of a casting which we are producing. The enclosed section shows holes that cause the castings to be rejected. From the following information can you come up with an answer to help us stop the holes in this casting? The casting weighs 24.5 lb and a ¾-in. hole is cored through the center. Casting is made in a 15 x 20-in. shell mold ¼-in. thick. The sand used in making the shell and the core is 90-100 AFS fineness. Shell resin content is 5 per cent; in the core it is 7 per cent. Coarse bank sand is used as back-up material and five molds are placed in a box 22 x 22 x 36 in. for pouring.

Charges are 1000 lb consisting of 40 per cent pig, 15 per cent sprue, 15 per cent rejections and 30 per cent foreign cotton mill scrap. Analysis of the pig is Si 2.70-3.00, S 0.027, P 0.70 and Mn 0.47 per cent. Charges include 40 lb of limestone, 2 lb of flux and 70 of coke. We use a 60-in. cupola lined to 42 in. Rear slagging is used.

ANSWER An examination of the casting, information and drawing which you have sent us indicates that your troubles are caused by something not mentioned in your description. We believe that the



Gating of shell mold casting

holes are caused by gas resulting from improper drying of ladles or the cupola spout or perhaps the bottom.

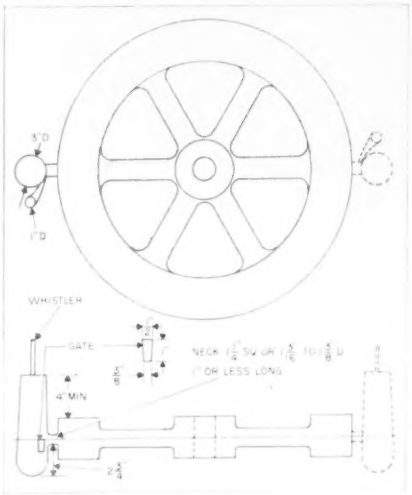
There is a possibility that your cores are undercured. Make sure that your cores are well vented. A ¼-in. vent rod should do the trick, and if gas is still present, you might try baking the cores in a conventional core oven until they are completely cured. If you use paste to hold the two halves of the mold together make sure that no paste gets into the vents. It appears from your drawing that a part of your riser is not feeding as it is located below the top of the castings. A change here might help. A choke in your gating system also may aid in solving your problem.

Examine the foreign cotton mill scrap that you use to make sure that no nonferrous materials are being introduced into the metal charges. A low pouring temperature could aggravate any gaseous condition present. While you did not say if other castings showed this gas condition, we believe the possibilities of the cause being in your refractory drying are high and suggest that you start your examination at that point.

Has Shrinkage in Gear Blanks

QUESTION We are having trouble with gear blanks in that when the teeth are cut eight out of ten show holes at the bottoms. Gears range from 50 to 500 lb with rims having 2 to 4 in. faces 1 to 4 in. thick. We have tried placing large risers on top of the rim and also on the outside. We also churned the rims until the metal would flow from riser to riser. Metal charges are composed of 400 lb pig iron (2.50 Si, 0.023 S, 0.120 P, 0.78 Mn), 300 lb return scrap, and 300 lb purchased scrap. We also tried 1 per cent Ni. Is there anything we can add to the iron which would help?

ANSWER Your difficulty with holes appearing at the roots or bottoms of the teeth probably is



Method for making sound gears

due to shrinkage resulting from inadequate feeding. You mention that risers did not help, and it should be pointed out that by the time the metal travelled from the hub into the risers it was considerably cooler than the metal in the rim and would provide little feeding.

Several procedures can remedy the situation. One is to place one or more risers, depending upon the size of the blank, as close to the outside periphery as possible, and gate into the risers. Suggested arrangement is shown in the accompanying illustration based on data presented by Winte and Barlow in the August, 1945 issue of FOUNDRY. Other possibilities are: use of cast iron denseners or chills around the periphery separated from the cavity by a thin layer of sand; or form the spokes or web, as the case may be, in a moldable exothermic refractory to reduce the cooling rate of those portions.

Calculation shows that your present iron contains about 2 per cent Si, and we believe that for gears it should be lower in the small ones, and considerably less for those with a 4 x 4-in. rim. That reduction can be accomplished by substitution of some steel scrap for some of the other raw materials. For the smaller gears we suggest 300 lb pig iron, 300 lb returns, 200 lb purchased scrap, and 200 lb steel scrap. For the heavy rimmed blanks try 200 lb pig iron, 300 lb returns scrap, 200 lb purchased scrap, and 300 lb steel scrap. Additions of nickel also could be tried to determine the effect.

Seepage in Bronze Fittings

QUESTION We are making 4 and 5-in. bronze L's, T's and Y's which have to withstand a minimum pressure of 75 psi for use with gasoline. We tested our first lot with 100 psi water pressure and find that about 50 per cent permit some seepage. We are using ingot valve bronze for the castings and no outstanding defects are visible. Walls of the fittings are about ¼-in. thick. If it is not too expensive we would like to impregnate the castings before machining with some material which will withstand gasoline.

ANSWER Seepage or leakage in your bronze fittings may be caused by gas picked up during melting or to improper gating which does not permit sufficient feeding during solidification. First step would be to examine melting conditions to see that the metal is melted under a slightly oxidizing atmosphere in the furnace. Also the metal should be melted as rapidly as possible, and when it reaches the pouring temperature, it should be taken from the furnace and poured. Per-

(*Concluded on page* 100)

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(*Concluded from page* 98)

mitting the metal to remain in the furnace at high temperature can cause gas pickup.

One method to ascertain whether the metal is gassy is to pour a plug about 1½ in. in diam and 5 in. long and observe whether or not the top sinks or pipes. If the top remains fairly flat or tends to "mushroom," it is an indication of gassiness. Another method would be to stir in 3 oz of copper oxide per 100 lb of metal about 5 minutes before pulling the pot and then deoxidizing in the usual manner with phosphor copper. Also you might try some of the proprietary degassifying agents on the market.

If the metal appears to be reasonably free from gas, look to your gating methods, and make any necessary adjustments which will insure that all sections of the casting are fed, and that the gate is last to freeze. Gating through a riser as close to the casting as possible is a good method to provide hot liquid metal where it is needed most.

Impregnation usually is applied after machining operations rather than before because those operations may uncover porous areas just below the as-cast surface. A number of firms supply suitable materials and equipment for impregnating casting, and names and addresses may be found in the advertising pages. Some firms in various locations also engage in contract or jobbing impregnation.

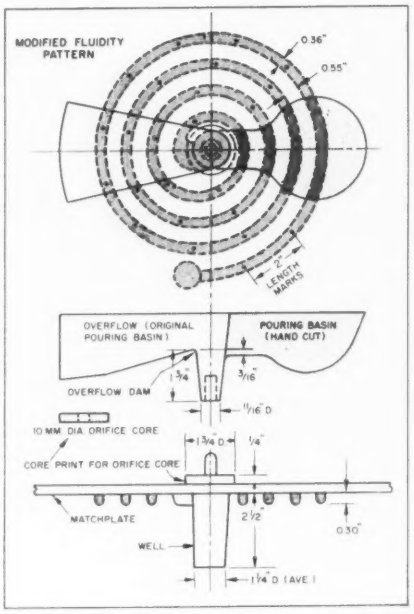
Fluidity Test for Gray Iron

QUESTION Some time ago in one of the issues of FOUNDRY we saw an illustration showing a spiral fluidity testing device. Can you supply us with information and details on it?

ANSWER Evidently you are referring to an article by Rosenthal and Porter on "What the Fluidity Test Reveals About Gray Cast Iron" which appeared in the August, 1953 issue. A sketch of the pattern for making molds for determining fluidity is shown in the accompanying illustration which, as the authors point out, is a modification of the original. Modification is simple, and consists of a hand-cut pouring basin as indicated.

This device is employed to ascertain the "running quality" or flowability of any metal or alloy—the ability of the metal to fill a mold cavity based on experimental data correlating length of spiral filled and the particular casting or castings.

Drawing shown is not full size, and the only critical dimensions are those indicated. We understand that the pattern illustrated



Spiral fluidity test pattern

may be purchased, and we suggest that you do that rather than try to make it yourself. Also we suggest study of the article mentioned since, as the authors mention, there is close relationship between fluidity, composition and pouring temperature, and the test is a useful tool in controlling the properties of molten gray cast iron.

Handling Copper-Nickel Alloy

QUESTION We are quoting on some 90-10 copper-nickel alloy castings, and as this is our first on nickel castings we will appreciate the proper procedures for melting and molding.

ANSWER Melting practice for copper-nickel alloys should follow that ably described by Kihlgren a number of years ago with specific reference to the 70-30 alloy. He advocates melting down the copper and nickel together under slightly oxidizing conditions, and then deliberately oxidizing the melt with either copper or nickel oxide when virgin metals are used. If appreciable copper-nickel return scrap is used the oxidation may not be necessary.

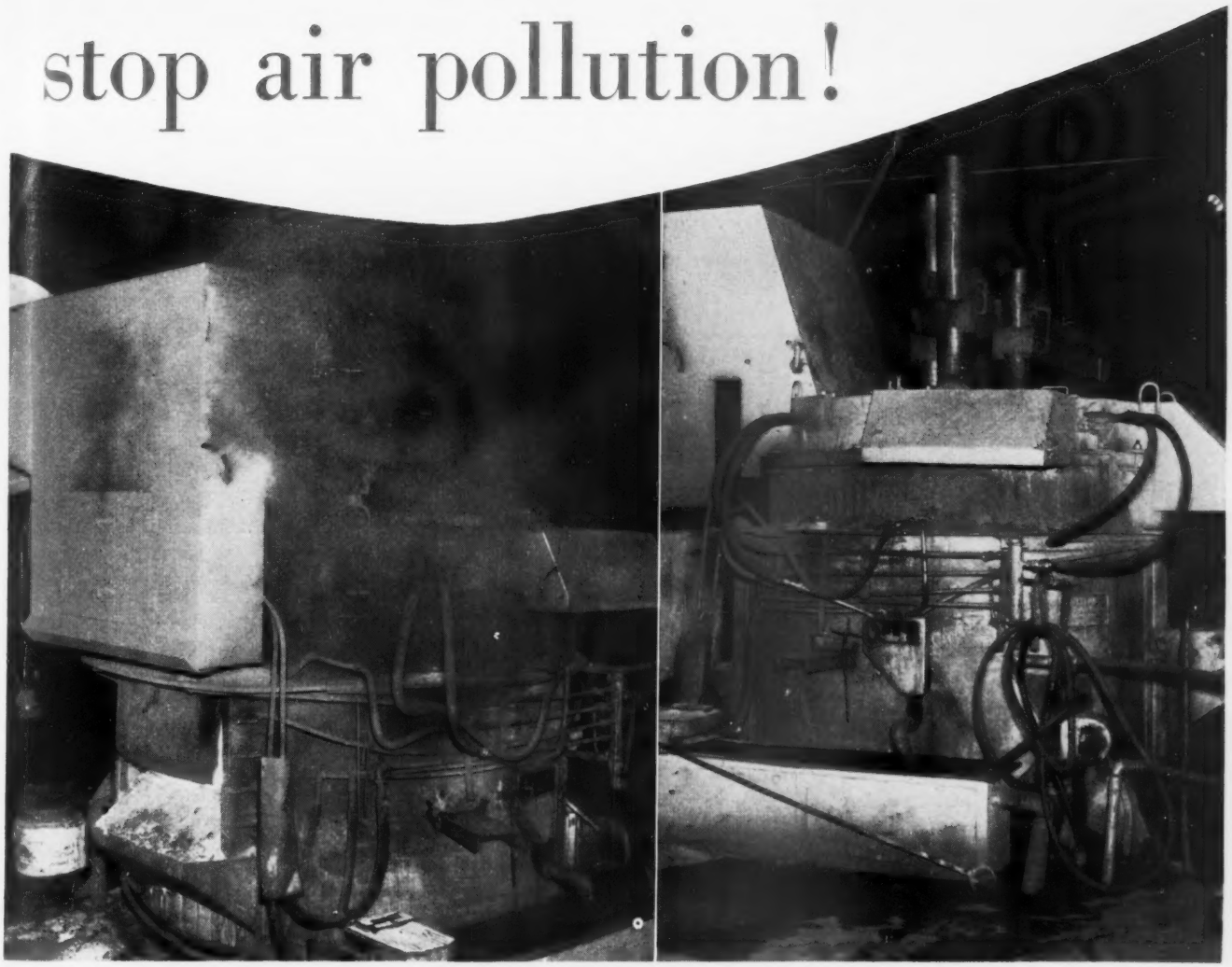
Amount of nickel oxide used is 1¼ oz per 100 lb or 3½ oz of copper oxide. Materials should be stirred in vigorously. After the oxidation treatment the remelt scrap is added, and the remelt should be clean—preferably sand blasted to remove foreign matter. About 3 to 5 minutes before pulling the pot, additions of 97 per cent manganese metal and low-carbon (refined) silicon metal are added for deoxidation. When the pot is pulled, addition of 0.025 to 0.50 per cent metallic magnesium is made as a precaution to counteract sulphur pickup.

In the case of the 70-30 alloy, additions of manganese and silicon metals are such as to give 1.20 per cent Mn and 0.55 per cent Si in the resulting copper-nickel alloy. However, two specifications we have seen for the 90-10 copper-nickel alloy appear to limit the silicon content to 0.10 per cent; so you will have to be governed accordingly, and hold the silicon addition to the level permitted in the specification you have to meet. Pouring temperature may range from 2500 to 2650° F depending upon section size.

Molding sand for the alloy should be refractory and fairly high in permeability. According to Kihlgren, a synthetic sand composed of 40 to 60 AFS grain fineness sand with 14 per cent clay and 4.5 to 5.5 per cent moisture serves satisfactorily. Mold surfaces may be coated with dry graphite by "dusting" or brushing. Cores should be moderately soft, well vented, and should collapse readily. Graphite or silica core wash may be used.

All heavy sections of the copper-nickel alloy castings must be risered adequately or chilled to insure progressive solidification. Preferable procedure is to gate into the heavy section through a riser which places the hot metal where it is needed during the solidification period.

stop air pollution!



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All these advantages add up to solid reasons why many leading steel foundries have selected Wheelabrator Dustube Collectors for controlling this fume problem. They add up to solid reasons why you should investigate Wheelabrator Dustube Collectors to get thorough dust and fume control at a price you can afford to pay.

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MEN OF INDUSTRY

STOWELL C. WASSON
. . . vice president-operations

ORELLO S. BUCKNER
. . . Grinding Institute Chairman

DAVID L. MURPHY
. . . Pullman-Standard supt.

JERVIS C. WEBB
. . . heads Conveyor Association

STOWELL C. WASSON has been elected vice president-operations, National Malleable & Steel Castings Co. succeeding the late Walton L. Woody. With headquarters in the company's Cleveland home office, he will supervise operations at company plants in Cleveland, Chicago, Indianapolis, Sharon, Pa., Melrose Park, Ill. and Phoenix, Ariz. Mr. Wasson joined the company in 1911, was appointed sales manager in 1921, manager of the Indianapolis works in 1929, and a director in 1947. Since 1943 he had been manager of the Cicero and Melrose Park, Ill., plants. He is one of the founders, past president and chairman of the Foundry Educational Foundation and a former director of the American Foundrymen's Society.

♦ ♦ ♦

C. W. Ammen, until recently foundry superintendent, California Brass Mfg. Co., Los Angeles, has been named superintendent, Universal Brass Mfg. Co., which is enlarging its foundry there. He was previously associated with Chrysler Corp. at the Michoud Ordnance Plant, New Orleans. Mr. Ammen authors FOUNDRY's Trouble Shooting department.

♦ ♦ ♦

Harrison O. Ash has been elected president-general manager, Aluminum Industries Inc., Cincinnati, succeeding **John W. Craig,** resigned. A graduate of Greenbrier Military Academy, Mr. Ash has served as president and director of Columbia Axle Co. and Bruce Macbeth Engine Co., Cleveland; and vice president-director of U. S. Air Compressor and Cleveland Pneumatic Tool Co., Cleveland.

Orello S. Buckner, president, Bay State Abrasive Products Co., Westboro, Mass., was recently elected chairman of the board of directors, Grinding Wheel Institute. Mr. Buckner was chairman of the institute's research projects committee during the past year.

♦ ♦ ♦

David L. Murphy was recently appointed superintendent of Pullman-Standard Car Mfg. Co.'s wheel foundry, Hammond, Ind., succeeding the late H. S. Schlettert. After 8 years with Griffin Wheel Co., Chicago, Mr. Murphy joined the Pullman company in 1923 and was assistant superintendent at its Michigan City wheel foundry and melting foreman at Hammond. In 1952 he became Mr. Schlettert's assistant.

♦ ♦ ♦

Norman C. Miller and **John D. Steely,** staff members, Los Alamos Scientific Laboratory, Los Alamos, N. Mex., recently received the Coolidge Award, presented by the Society for Nondestructive Testing and the X-ray Department, General Electric Co., Milwaukee, for their paper covering a 3½ year history of a fixed-beam betatron installation.

♦ ♦ ♦

Paul J. O'Rourke recently joined Grabler Mfg. Corp., Cleveland, as foundry supervisor. He was previously associated with Gunite Foundries Inc., Rockford, Ill., American Steel Foundries, Chicago, and Homer Foundry Corp., Coldwater, Mich.

♦ ♦ ♦

Edwin A. Wert has joined Centro-Cast National Precision Casting Corp., Clifton Heights, Pa., as sales representative in California, Nevada and Arizona.

Jervis C. Webb, president-general manager, Jervis B. Webb Co., Detroit, was recently elected president of the Conveyor Equipment Manufacturers Association at its 21st annual meeting. He succeeds **R. F. Tomlinson,** manager, conveyor department, Oliver Corp., A. B. Farquhar Division, York, Pa. **R. C. Sollenberger** was re-elected executive vice president with headquarters at Washington. Elected vice president, treasurer and secretary, respectively, were **Fred S. Wells,** vice president, Stephens-Adamson Mfg. Co., Aurora, Ill.; **E. E. Boberg,** sales manager, Standard Conveyor Co., North St. Paul, Minn.; and **R. B. Maas,** president-general manager, Screw Conveyor Corp., Hammond, Ind. Directors are: **D. E. Davidson,** vice president-sales, Link-Belt Co., Chicago; **J. H. Walker,** president, Fairfield Engineering Co., Marion, O.; and **Adrian W. Rich,** president, Fairmont Machinery Co., Fairmont, W. Va.

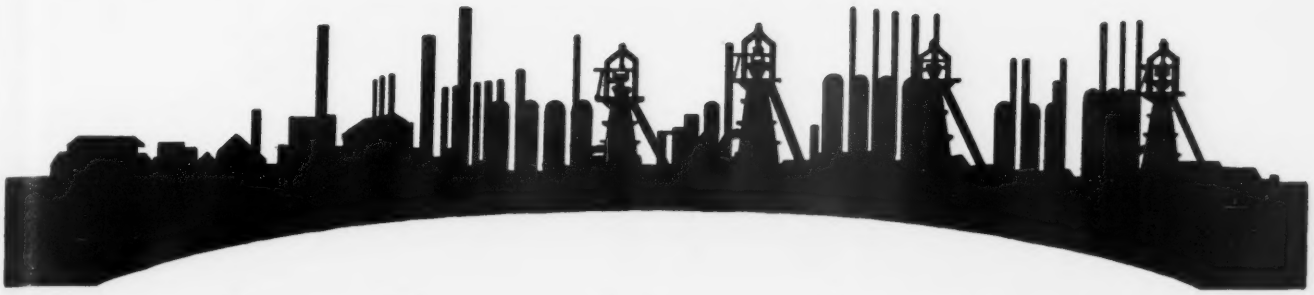
♦ ♦ ♦

Paul Zeigler, director of Kaiser Aluminum & Chemical Corp.'s Department of Metallurgical Research, in Spokane, Wash., has been transferred to the company's headquarters in Oakland, Calif. **Dr. D. W. Smith,** associate director of metallurgical research in Spokane, has assumed additional duties as laboratory manager. **S. E. Maddigan,** head of the mechanical evaluation section, has been named an assistant director of the department.

♦ ♦ ♦

E. Q. Sylvester, who has been awarded the Melville Prize Medal of the American Society of Mechanical Engineers, is president of the Griffin

(Continued on page 105)



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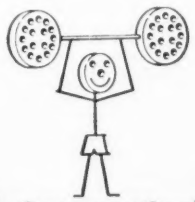

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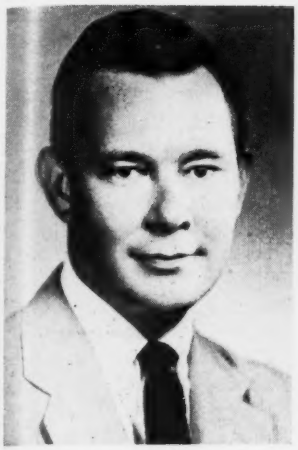


R. M. MILLER
. . . v. p., Stearns Magnetic

EDGAR M. CARVER
. . . consultant, Dodge Mfg.

CARL W. PETERSEN
. . . Dodge Mfg. Corp. v. p.

ANDREW K. KOLAR
. . . Link-Belt purchasing

(*Continued from page* 102)
Wheel Co., Chicago. An item in November FOUNDRY indicated that Mr. Sylvester is executive vice president of that company.

♦ ♦ ♦

R. M. Miller, formerly manager of the transmission plant, Stearns Magnetic Inc., Milwaukee, has been appointed vice president in charge of sales, production and engineering. He attended Wisconsin University and joined the company in 1946.

♦ ♦ ♦

Robert L. Doelman, president of the Chicago Chapter of the AFS for 1954-55, is sales engineer, Miller & Co., Chicago. Mr. Doelman attended Collegiate Institute, Toronto, Ont., and from 1939 to 1942 was associated with Electric Steel Ltd., Cap de Madeleine, Quebec, where he became assistant foundry superintendent. He spent 4 years as foundry consultant, Harry W. Dietert Co., Detroit, and joined Miller & Co. in 1946. He was secretary of the Chicago Chapter for 2 years and served as its vice president last year.

Carl W. Petersen, since 1942 general superintendent, Dodge Mfg. Corp., Mishawaka, Ind., has been elected vice president-works manager. **Edgar M. Carver** has retired as first vice president and will continue as a director and act as consultant to the company. Mr. Petersen, a graduate of Iowa State College, joined Dodge in 1924. Mr. Carver joined the company in 1909, following graduation from Purdue University.

♦ ♦ ♦

Robert R. King has been named vice president-general manager, Paxton-Mitchell Co., Omaha, Nebr. Mr. King was graduated from Iowa State University and joined the company in 1946 as a draftsman. He served in various departments including sales and service work in the Chicago area, and for the past 3 years was vice president-engineering and production. **Christian H. Petersen,** for 3½ years sales-service engineer in the company's Chicago territory, has been appointed sales-service manager for Paxton-Mitchell. A graduate of Northwestern University, Mr. Petersen was previously associated for 7 years with Chicago & North Western Railroad.

♦ ♦ ♦

Andrew K. Kolar has been named purchasing agent for Link-Belt Co.'s Pershing Road plant, Chicago, succeeding **Henry M. Coen,** who has retired after 45 years with the company. Mr. Kolar joined the plant in 1935 following graduation from Purdue University, and worked in the foundry, steel shop, production, sales and engineering there until 1947 when he was transferred to Moline, Ill., as sales engineer, later becoming district manager. He returned to the Pershing Road plant in 1951 as assistant sales manager.

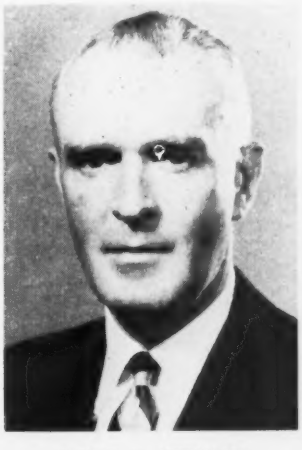
♦ ♦ ♦

Daniel T. Wellman, president, Wellman Bronze & Aluminum Co., Cleveland, was elected president of the Magnesium Association, New York, at its 10th annual meeting in St. Louis. **James E. Pepall,** president, Magnesium Co. of Canada, Montreal, was named vice president, and **J. V. Cosman,** president, Superior Bearing

ROBERT L. DOELMAN
. . . heads Chicago Chapter

ROBERT R. KING
. . . Paxton-Mitchell executive

CHRISTIAN H. PETERSEN
. . . sales-service mgr.



DANIEL T. WELLMAN
. . . heads Magnesium group

MEN OF INDUSTRY

Bronze Co., Brooklyn, N. Y., was re-elected treasurer. **Jerry Singleton** and **Martha I. Hansen** continue as executive secretary and assistant secretary, respectively.

♦ ♦ ♦

Albert C. Hubbard, formerly superintendent, Three Rivers Casting Corp., Three Rivers, Mich., has been appointed general foundry superintendent, Tioga Foundry Corp., Owego, N. Y. Mr. Hubbard's previous connections include: consultant, Pioneer City Casting Co., Belpre, O.; superintendent, Wiard Plow Co., Batavia, N. Y.; general foreman, International Heater Co., Utica, N. Y.; and foundry foreman, American Radiator & Standard Sanitary Corp., Buffalo, N. Y.

♦ ♦ ♦

Frederick F. Franklin, until recently assistant district manager, Cleveland office, Vanadium Corp. of America, New York, has been appointed district manager, succeeding **Paul H. Shaeffer,** retired, who will serve as a special representative. Mr. Franklin, with the company 10 years, was chief of the ferroalloys branch and assistant director, Iron and Steel Division, NPA, during the Korean emergency.

♦ ♦ ♦

George W. Belcher has been appointed central district manager of sales and technical service, Titanium Metals Corp. of America, Chicago. Mr. Belcher was graduated from Rensselaer Polytechnic Institute and until recently was technical service representative, Allegheny Ludlum Steel Corp., Watervliet, N. Y.

♦ ♦ ♦

Bert H. McGill, formerly vice president-general manager, Toronto Hardware Mfg. Co., Toronto, Ont., has been appointed president - general manager, Eclipse Fuel Engineering Co. of Canada Ltd., Toronto, affiliate of Eclipse Fuel Engineering Co., Rockford, Ill. **Gordon Bouvier** is vice president-sales manager of the Canada plant.

♦ ♦ ♦

William H. Shinn, chairman of the Northern Illinois-Southern Wisconsin Chapter of the AFS, is assistant sales manager, Castings Division, Gunite Foundries Corp., Rockford, Ill. Mr.

WILLIAM H. SHINN
. . . AFS chapter chairman

Shinn served his apprenticeship for over 4 years with Gunite Foundries, and later became assistant production manager and sales engineer. He was vice chairman of the Northern Illinois-Southern Wisconsin Chapter last year, and previously was secretary and director.

♦ ♦ ♦

Henry M. Viberg has been appointed chief mechanical engineer in the foundry division, Longue Point Works, Canadian Car & Foundry Co., Montreal, Que.

♦ ♦ ♦

Adm. Alan G. Kirk has been elected president, Mercast Corp., New York, succeeding **S. J. Sindeband,** who recently was named president, Teleregister Co., New York. For the past year Admiral Kirk was board chairman of Mercast Corp. **Dr. Irvin R. Kramer** and **Ronald D. Gumbert** are vice presidents, and **Henry Maier,** secretary.

♦ ♦ ♦

Carl A. Larson, partner, Reliance Pattern Works, Chicago, was re-elected president of the Chicago Foundrymen's Association at a meeting on Nov. 29. **Joseph Vilbig,** president and treasurer, Fox Valley Foundry Co., Aurora, Ill., was elected vice president. **R. H. Lehmpuhl,** secretary, Sheffield Foundry Co., Chicago, was elected secretary-treasurer, and **J. R. Shumway,** partner, C. W. Shumway & Sons, Batavia, Ill., was named a director. **Mildred Kosar** continues as executive secretary at 343 S. Dearborn St., Chicago 4.

♦ ♦ ♦

William Propst has been elected president, Chemalloy Foundry Inc., Louisiana, Mo., subsidiary of Killark Electric Mfg. Co., St. Louis. He succeeds **James Madden,** president since the company was organized in 1945. **Berkley Jones** was named vice president, and **Viola Rembeld,** secretary.

♦ ♦ ♦

Richard C. Yetter, Chicago, has been appointed Midwestern representative, Shallway Corp., Connellsville, Pa., sales and service distributor for Shalco Engineering Corp., Palo Alto, Calif. A graduate of Wayne University, Mr. Yetter was formerly associated with Acme Aluminum Alloys Inc., Dayton, O., and Ebaloy Foundries Co., Rockford, Ill. **Glenn S. Marks,** McKeesport, Pa., has been named Central Area sales-service representative.

♦ ♦ ♦

C. M. Davis, formerly plant metallurgist at the Litchfield, Ill., plant, American Radiator & Standard San-

(*Concluded on page* 108)

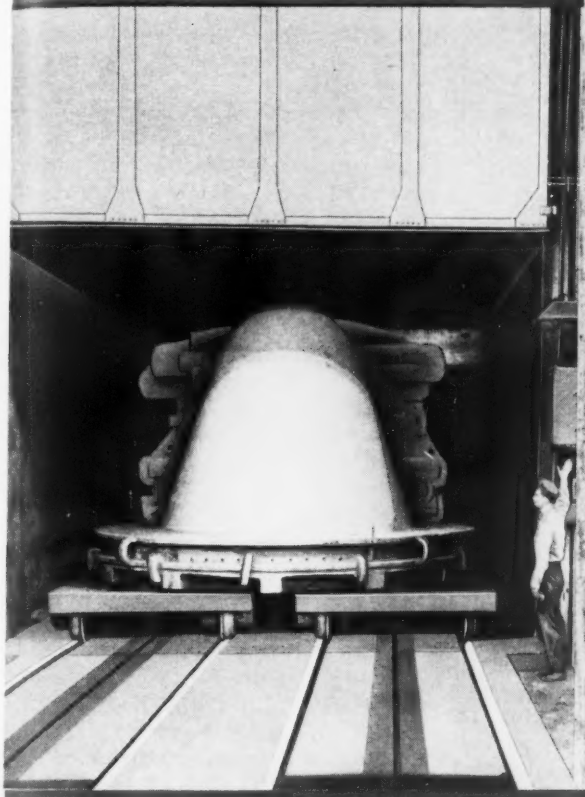
BERT H. McGILL
. . . Eclipse Fuel pres., Canada

ADM. ALAN G. KIRK
. . . Mercast Corp. pres.

GLENN S. MARKS
. . . Shallway Corp. sales

RICHARD C. YETTER
. . . joins Shallway Corp.

OVENS



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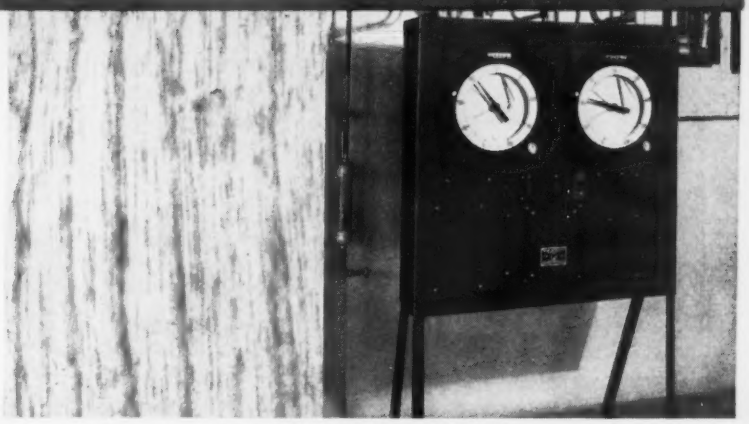


MEN OF INDUSTRY

(*Concluded from page* 106)

itary Corp., Pittsburgh, has been appointed metallurgist, South Gate Aluminum & Magnesium Co., South Gate, Calif.

♦ ♦ ♦

W. C. Shea has been appointed manager of institutional sales, and **T. J. Bromeling,** manager of industrial sales, the Colson Corp., Elyria, O. Mr. Shea joined the company in 1926, and previously served as advertising manager, and recently as assistant sales manager. For the past 12 years Mr. Bromeling was assistant sales manager, Service Caster & Truck Corp., Albion, Mich., recently acquired by the Colson company.

♦ ♦ ♦

George L. Teller has been appointed co-ordinator of steel castings, West Allis Works purchasing department, General Machinery Division, Allis-Chalmers Mfg. Co., Milwaukee. He attended Drexel Institute of Technology and joined the company in 1951. **James J. Gilboy** has succeeded Mr. Teller in the Philadelphia purchasing division regional office.

♦ ♦ ♦

Raymond Shile has been appointed manager of the new Eastern sales office opened in New York by Palmer-Shile Co., Detroit. Mr. Shile was graduated from U. S. Naval Academy in 1938. After Navy service in World War II he joined the company as a sales engineer and has served in that capacity ever since with the exception of 3 years' service with NATO in Europe during the Korean War.

♦ ♦ ♦

LeRoy M. Gill has been appointed sales manager, Michigan Oven Co., Detroit. A graduate of Lawrence Institute of Technology, Mr. Gill has worked in engineering, field erection supervision and sales since joining Michigan Oven in 1949.

Wilbert J. Fruechtel has retired from the C. O. Bartlett & Snow Co., Cleveland, after many years of service with that company. Mr. Fruechtel joined Bartlett-Snow in 1912 as a draftsman. He left in 1916, working for a time at Forest City Foundries Co. and Arthur G. McKee & Co. He returned to Bartlett-Snow in 1918

WILBERT J. FRUECHTEL

but left again in 1919 to spend five years with other concerns. Rejoining Bartlett-Snow in 1924 as an estimator, he was transferred to the sales department in 1928 and remained there since that time. In recognition of Mr. Fruechtel's long service, company executives gave him a testimonial dinner at Detroit on Nov. 19. It was attended by many key persons from companies where he handled equipment installations. Featuring the dinner was the presentation to Mr. Fruechtel of a bound book of testimonial letters received from these companies concerning his service to the foundry industry.

♦ ♦ ♦

Alfred H. Lewis, since 1951 central New York branch manager in Syracuse, N. Y., Crucible Steel Co. of America, has been named sales manager, Vacuum Metals Corp., its subsidiary which recently was moved to Syracuse. After leaving Syracuse University, Mr. Lewis joined Crucible Steel Co. where he became chief metallurgist, transferring to sales in 1947. He is a former chairman of the Syracuse Chapter of the American Society for Metals.

♦ ♦ ♦

William L. Kurtz has been appointed a director and assistant to the president in charge of advertising and new product development, W. W. Sly Mfg. Co., Cleveland. A graduate of John Carroll University, he has been with the company 5 years in sales and engineering.

♦ ♦ ♦

William E. Bailey has been appointed Chicago representative of air conditioning equipment, Dravo Corp., Pittsburgh. Associated with the company for 12 years in various engineering and sales capacities, Mr. Bailey was formerly representative in the Pittsburgh area.

♦ ♦ ♦

Dr. Henry J. Fisher, formerly with physical metallurgy division, Department of Mines and Technical Surveys, Ottawa, Canada, has joined the staff of the metallurgy research department, Materials and Processes Laboratory, General Electric Co., Schenectady.

♦ ♦ ♦

Ray M. Meyer, chairman of the Central Ohio Chapter of the AFS for the current year, since 1952 has been general coreroom supervisor, Ohio Steel Foundry Co., Springfield, O. He joined the company in 1939, serving as foundry inspector and sand supervisor, and supplementing his work with vocational courses. Active in the Central Ohio Chapter, Mr. Meyer has been a director, treasurer, and was vice chairman last year.

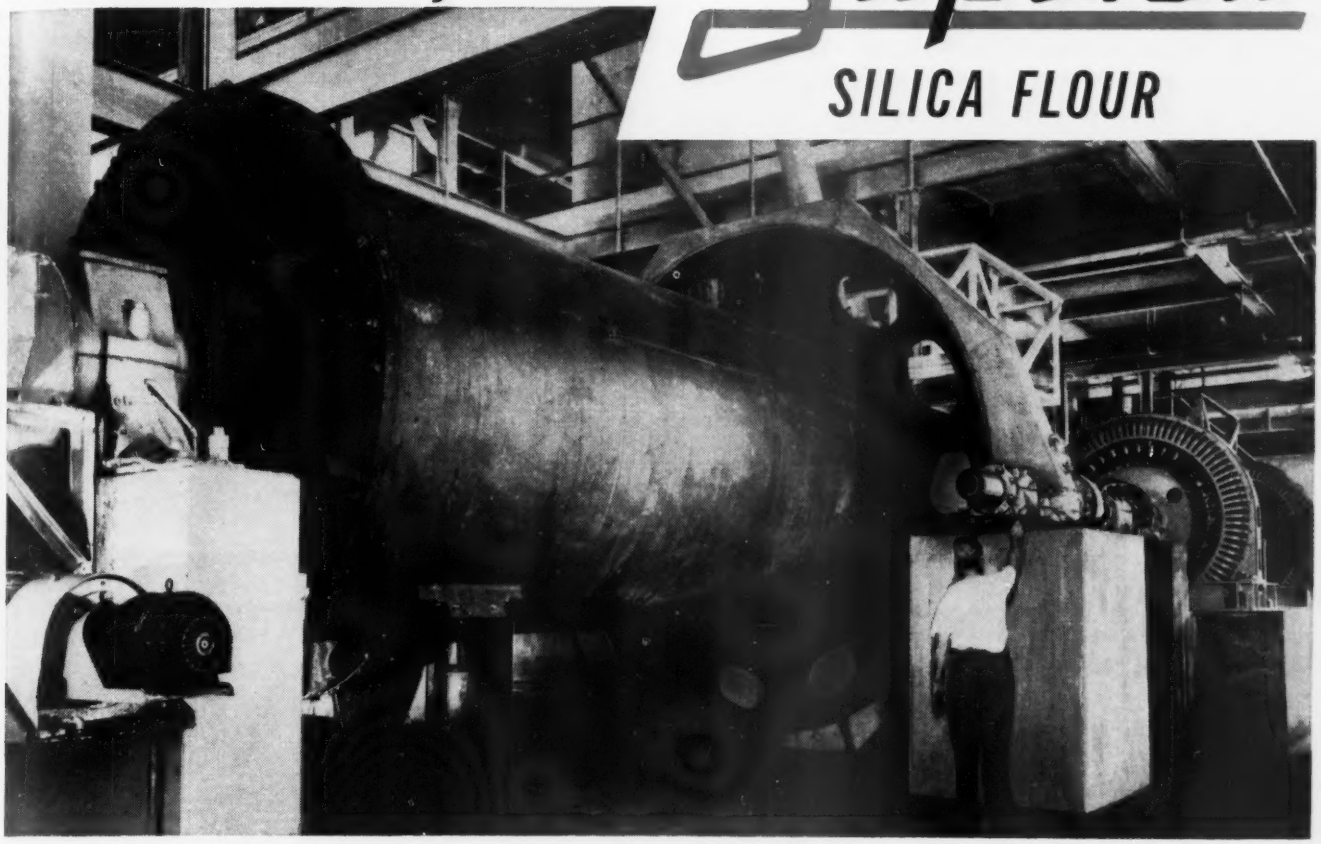
RAYMOND SHILE
. . . Palmer-Shile district mgr

LeROY M. GILL
. . . Michigan Oven sales mgr.

ALFRED H. LEWIS
. . . Vacuum Metals sales mgr.

RAY M. MEYER
. . . AFS chapter chairman

Controlled Grinding Produces Absolutely Uniform Supersil SILICA FLOUR



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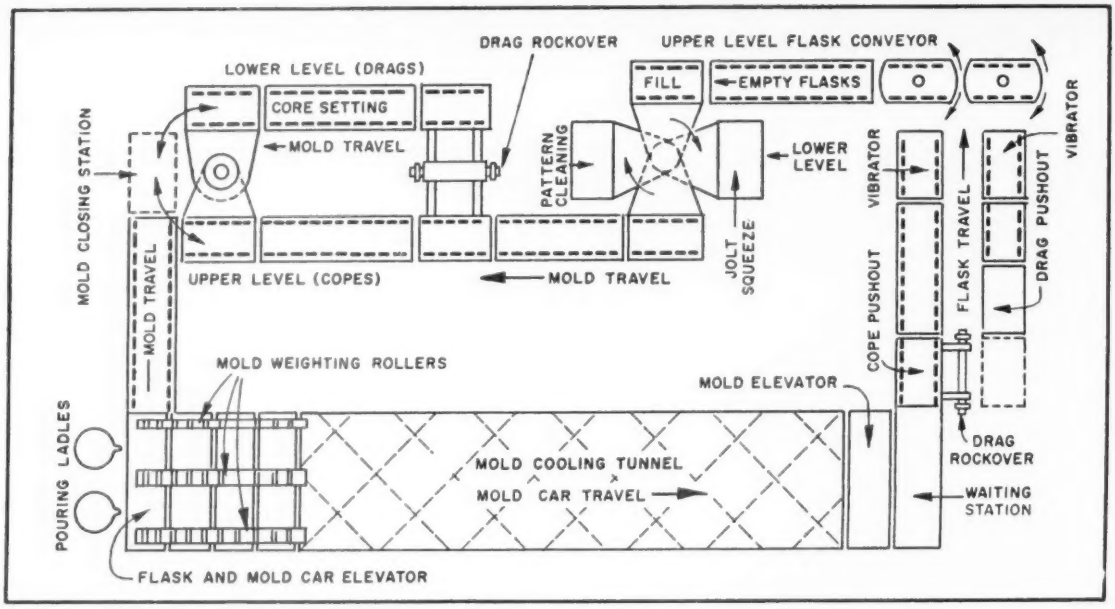


Diagram of half of the twin molding system shows high degree of automation

Molding System Is Highly Automated

By ROBERT H. HERRMANN
Associate Editor

AUTOMATIC foundries come closer to reality with the new closed circuit molding system now in operation at Eberhard Mfg. Division of Eastern Malleable Iron Co., Cleveland. Green sand mold halves are made, closed, shaken out, the flasks separated and returned to the rotary molding unit continuously in automatic sequence. Sand is mixed and fed to the system in the same manner. While pouring now is done by remote control through pushbuttons, plans are being considered to do the job automatically some time in the future.

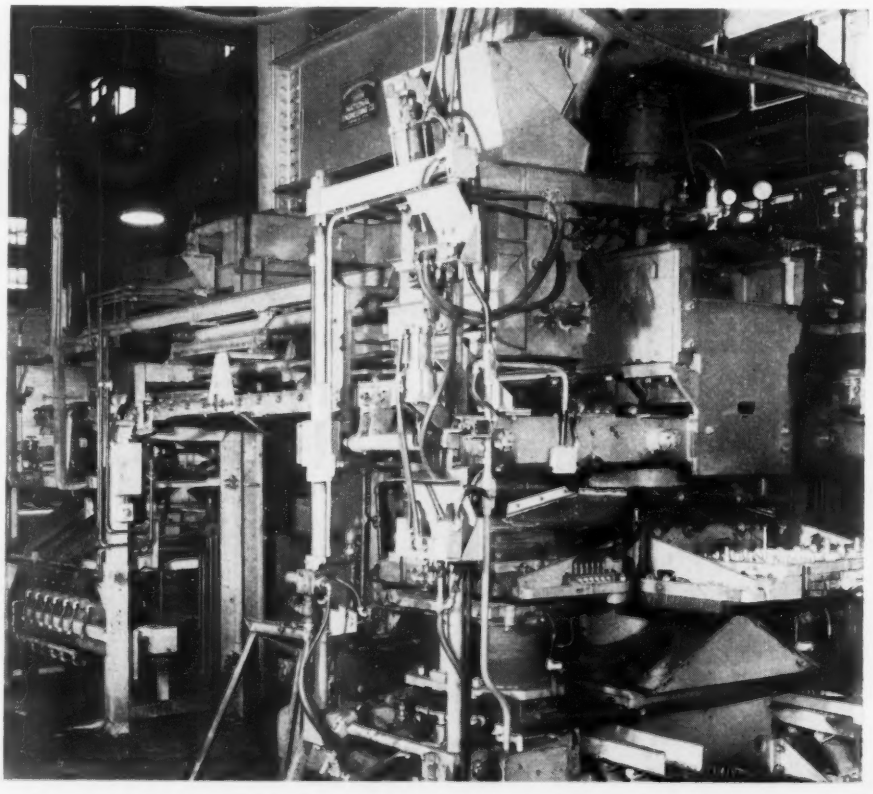
The Eberhard system will turn out 300 completed molds an hour. Castings range in weight from ½-oz to 2¼-lb. Flasks are 18 x 28 x 4½-in. deep, but depths may range to 9 in. Both cope and drag units are barred. The entire system consists of two independently operating halves, each with its own rotary molding unit and attendant equipment.

The system is so new that manpower requirements have not yet been determined. But C. H. Lambert, plant superintendent, foresees its operation with a foreman, one oiler, one pourer who will be spelled by two required laborers, two core setters (when needed) two maintenance men, and two operators. The operators are more than button pushers. They must know electronics and mechanics and be familiar with the "whys" and "hows" of all parts in the system.

All automation devices in the system are powered by air at 100 psi line pressure except the pouring devices. These are operated hydraulically at 70 psi through pushbutton electronic controls.

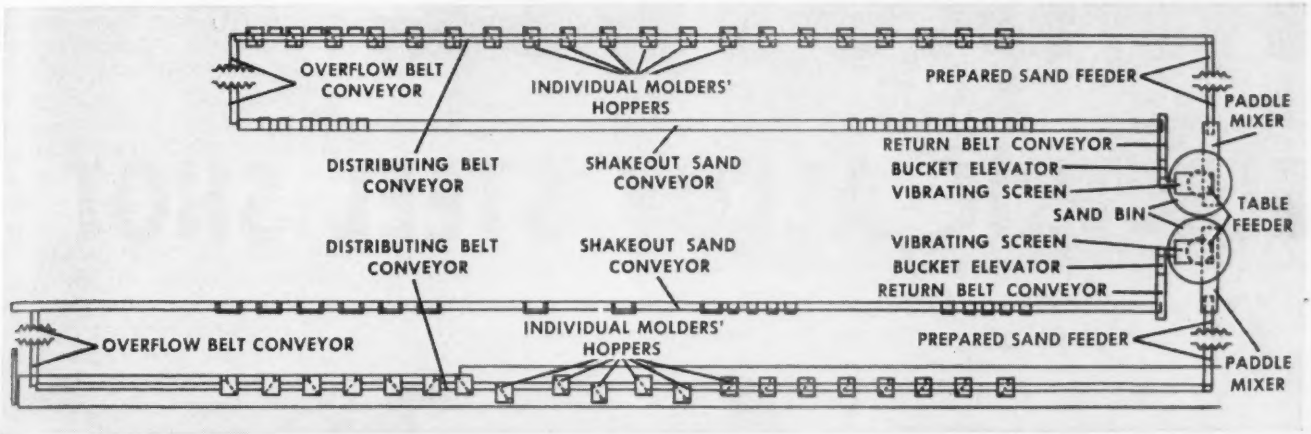
How the System Works—The system is divided into two identical pro-

(*Continued on page* 113)

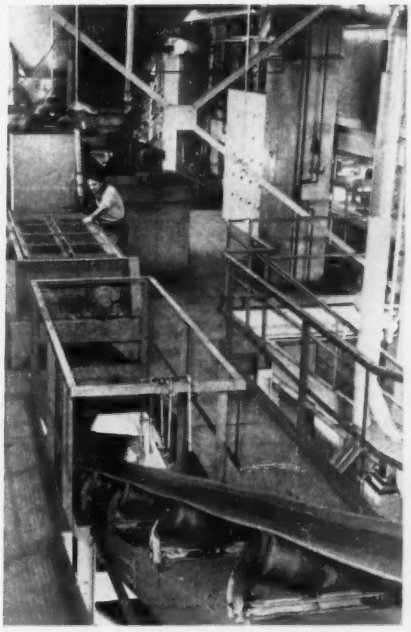


View of rotary molding machine, with upper level flask supply conveyor at left center, flask filling station at center, and pattern cleaning station, right

Now 3 Crouse-Hinds foundries are LINK-BELT mechanized



▲ At squeeze molding side of Crouse-Hinds' Syracuse aluminum foundry, sand travels on Link-Belt distributing belt conveyor over molders' hoppers. Overflow sand is carried on Link-Belt cross belt conveyor in background to shakeout belt conveyor, which is also fed by hoppers at foot ends of roller conveyors.



Link-Belt equipment on sand preparation floor includes storage tank, revolving plate feeder, double paddle mixer and inclined belt conveyor delivering to distributing belt conveyor. Operation involves two similar systems, each feeding 20 molders' hoppers at a capacity of 35 tph of prepared sand. ▶

New Syracuse aluminum foundry gets modern sand handling system

LINK-BELT mechanization reduces unit costs . . . speeds production . . . betters working conditions. And Crouse-Hinds has proved it — *three times since 1928.* The most recent installation — in their Syracuse aluminum foundry — provides low-cost sand handling. Sand is moved mechanically through preparation, molding, shakeout and reconditioning.

If your castings output is limited by an outdated handling system, Link-Belt mechanization is the answer. Your foundry may be large or small — gray iron, steel, malleable or non-ferrous. Whatever your requirements, Link-Belt equipment and proved engineering practices can cut your operating costs . . . conserve manpower for more exacting jobs. Our foundry specialists will pool their experience and judgment with yours and your consultants' to provide smooth coordination between operations . . . boost production in present floor space. And it all begins with a call to your nearby Link-Belt office.

13,654

LINK-BELT

CONVEYORS AND PREPARATION MACHINERY

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

AMASTEEL

ELECTRIC ALLOY STEEL SHOT

THE USER OF AMASTEEL CAN SAVE MORE THAN HALF HIS SHOT COST, MACHINE REPAIR PARTS & MAINTENANCE LABOR

AMASTEEL, a genuine electric steel, is frequently imitated but never equalled. It is packed with cleaning power, and here are some of the things it will do: last many times longer than regular shot; reduce maintenance costs 60%; save 75% of time lost due to machine repairs; produce a more attractive finish. Work cleaned with AMASTEEL will have a silver-like, burnished appearance.

AMASTEEL GRIT

is new and available now! For the first time you can select a genuine steel grit!

AMABRASIVE

an all-steel compounded abrasive that is setting a new standard

ALLOY METAL ABRASIVE CO.

121 S. Division St., Ann Arbor, Mich.

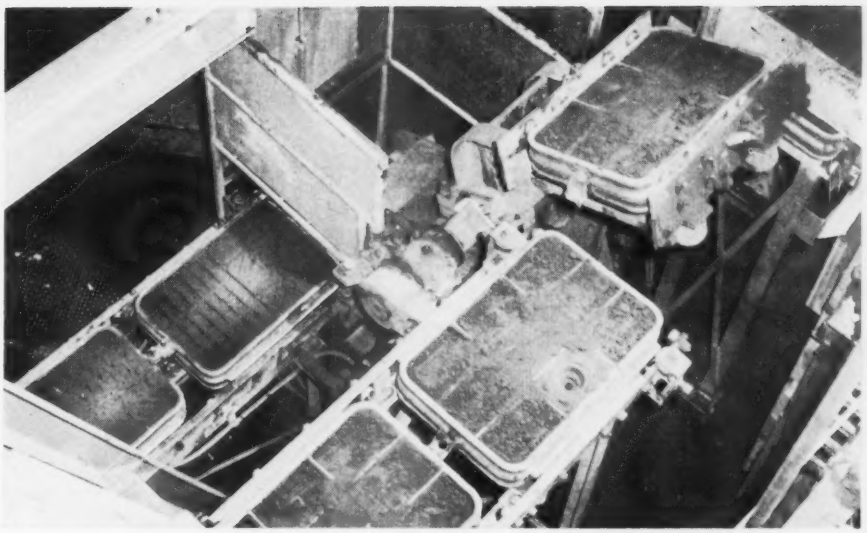
(*Continued from page* 110)

duction halves. Sand from a common 170-ton capacity overhead storage hopper is fed by gravity through powered gates to a measuring hopper over the muller in each half. Probes in each hopper relay data on sand temperature and moisture content to a water adding device. It calculates the required water addition for the desired moisture content of the sand—in this case, 2½-per cent—and opens a valve, allowing water to flow into a tank.

Meanwhile, a predetermined volume of southern bentonite from a 1000-lb capacity hopper has been measured into a section of tube connected to the muller. A second hopper and measuring device for each muller is available for handling another type of bond if it is needed.

When electrical probes in the molding machine sand hopper show a low sand level, premeasured sand, bond and water are emptied into the muller. At the end of the 2½-minute mulling cycle the mix is discharged directly into the molding machine hopper, and ingredients are measured in readiness for the next cycle. Molding sand used here is 120 AFS fineness, 9-10 psi green strength and 45-50 permeability in addition to the 2½-per cent moisture.

Molding unit in the system is a four-station rotary machine. It handles two cope and two drag patterns held at 90-degree points around the indexing shaft by protruding arms. Patterns are mounted on platens which fit over pins on the arms. Consequently patterns can be changed in seconds simply by lifting one platen off the pins and putting another in place. Platens also have aligning holes or pins for holding drag or cope flasks in position during mold making operations. The machine rotates five times a minute with a dwell time of 10 seconds at each station.

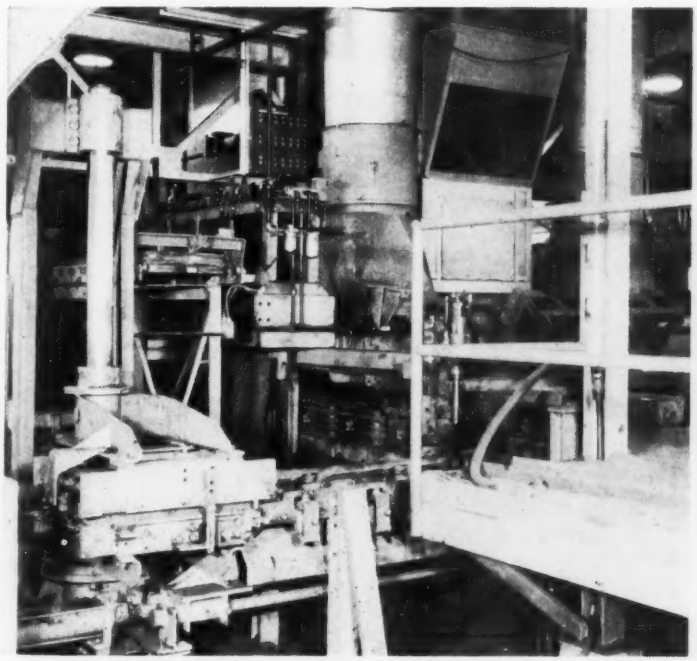


Drag rockover device is shown tipping a drag from upper level conveyor at right to adjacent, lower level conveyor. Coresetting station is at left

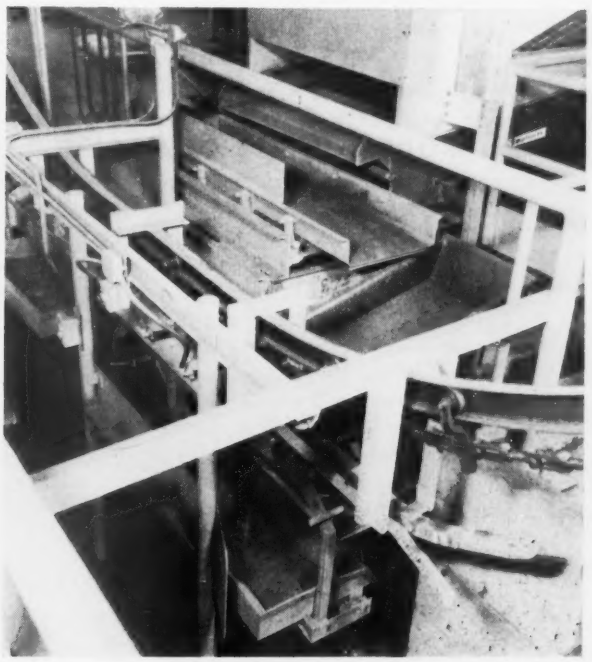
Cope and drag flasks are fed to the molding machine alternately from a horizontal wheel conveyor about 5 ft off the floor. An air cylinder arm pushes them, one at a time, onto an expanding section of wheel conveyor into position under the sand hopper. The pattern-carrying platen is raised from the rotating arms, and, just as it contacts the bottom of the flask, the sides of the expanding wheel conveyor section are pulled back to release the flask so that it can be carried upward about an inch to contact the sand hopper opening. Gates then are opened to drop a premeasured quantity of sand into the flask.

When the gates close, the filled flask is lowered to the rotating arms. The molding machine indexes 90 degrees clockwise. As it rotates, brushes on the first arm of each pair of arms remove sand from the stools at

(*Continued on page* 116)



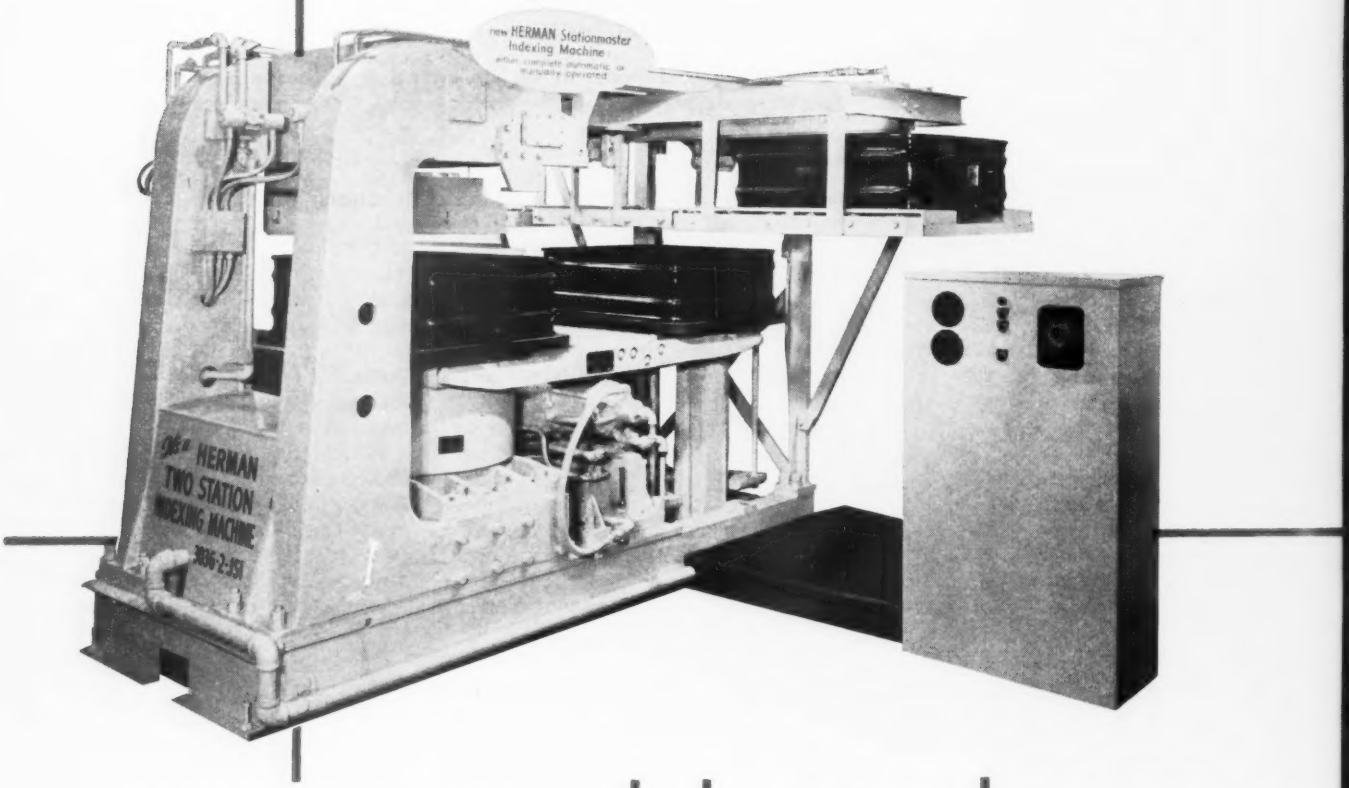
Mold-closing device is at left, entrance to cooling tunnel at center. Mold pouring is controlled from booth with large window shown at upper right



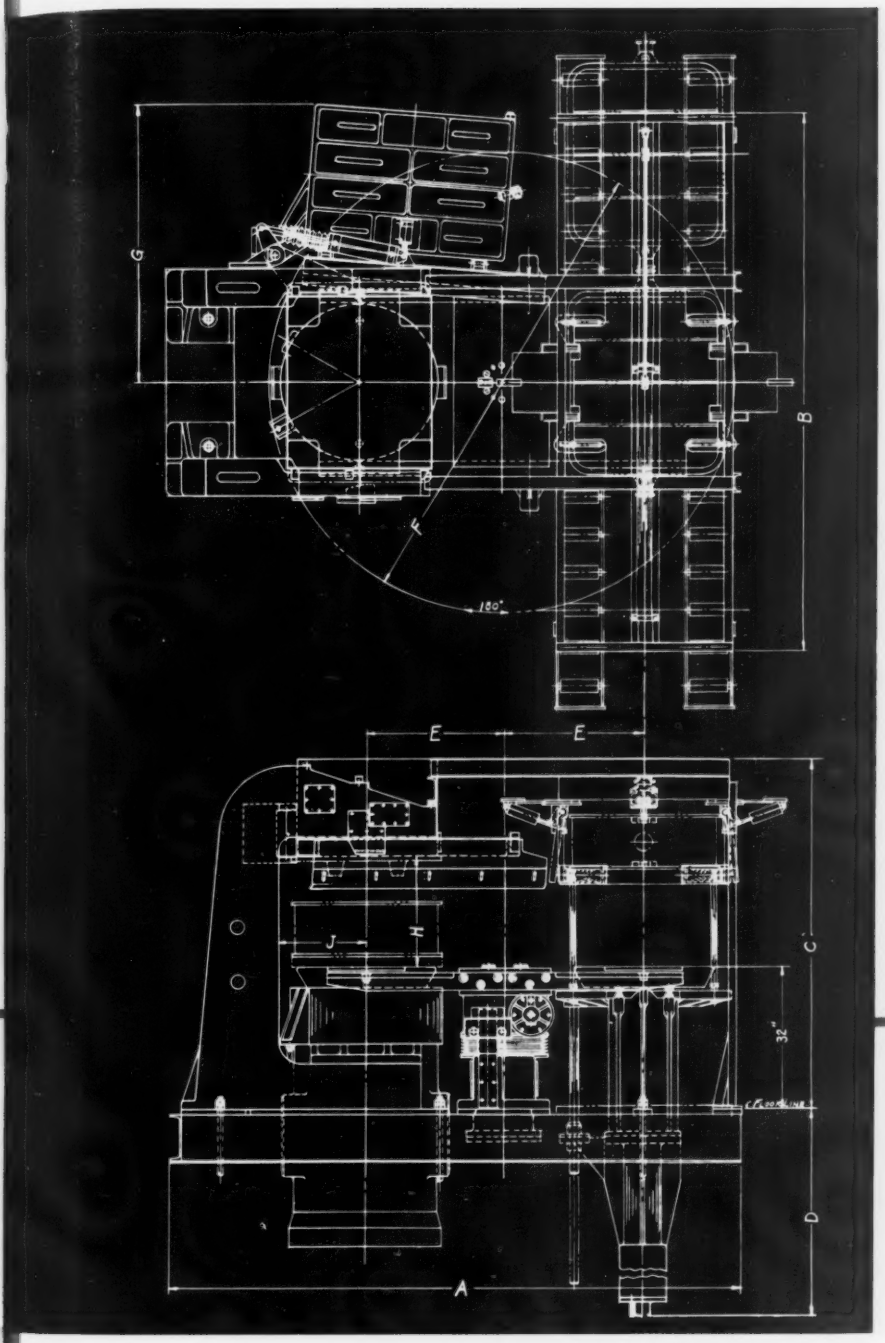
Castings are discharged from vibrating shakeout at top center and flow down the two vibrating feeders ino the three-sided box on the monorail conveyor

the HERMAN stationmaster

OUR NEW TWO-STATION INDEXING TYPE JOLT, SQUEEZE, STRIP MACHINE



MODEL NUMBER OF MACHINE		3036-2-JSI	4248-2-JSI
Nominal Flask Size Range (Width)		20" Min. — 30" Max.	30" Min. — 42" Max.
Nominal Flask Size Range (Length)		24" Min. — 36" Max.	36" Min. — 48" Max.
Jolt Load Max. @ 80# Pressure		2500#	5000#
Jolt Cylinder Diameter		8½"	13"
Squeeze Cylinder Diameter		28"	36"
Squeeze Capacity @ 80# Pressure		49,000#	80,000#
Squeeze Piston Stroke		10"	14"
Maximum Pattern Draw		18"	23"
Strip Pin Centers (Width)		19" Min. — 35" Max.	29" Min. — 48" Max.
Strip Pin Centers (Length)		26"	38"
Floor to Pattern Carrier Plate		32"	32"
Overall Length	A	10'-4"	13'-3"
Overall Width	B	9'-6"	11'-6"
Overall Height from Floor	C	6'-5"	7'-7"
Depth Below Floor	D	4'-6"	5'-10"
Center Line Index to Center Line Squeeze or Strip	E	30"	38"
Sweep Clearance Diameter of Turret	F	8'-3"	11'-0"
Center Line Squeeze to Platen Withdrawn	G	5'-0"	7'-0"
Pattern Plate to Squeeze Platen	H	24"	36"
Center Jolt and Squeeze to Back Housing	J	19"	28"



FEATURES:

1. Proper jolt insured by adjustable Bunter Control Valve and Timing Device.
2. Squeeze pressures adjustable to a maximum.
3. Adjustable strike-off bar.
4. Retractable squeeze head permits direct sand filling through variable sand hoppers mounted on squeeze head support.
5. Squeeze piston provided with limit stop.
6. Adequate registrations insure accurate location of flask at all positions.
7. Jolting, squeezing pneumatically operated.
8. Other operations controlled by proven pneumatic hydraulic application to insure fast, smooth, positive action.

Machines may be controlled automatically, semi-automatically or manually. Simultaneous operations are performed at each of the two stations of this indexing machine, resulting in a faster cycle and higher production.

The Herman Stationmaster is one of a complete line of Herman Molding Machines, in all types and sizes, to fit all foundry operations. Why don't you get in touch with us right now for more information. Write for our catalog No. JSI-2-54.

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH 22, PA.

HERMAN

Best Known Name in Molding Machines

(*Continued from page* 113)

the four work stations. It falls to two vibrating conveyors 8 in. wide and 3 in. deep which empty through floor openings to a return sand belt.

At the next station the mold is jolted and raised against the squeeze head. Once again it is lowered to the rotating arms to be indexed to the draw station. Here it is raised to another expanding section of wheel conveyor. This time the sides are open to receive the flask. When it is in position, the sides close to hold the flask as the pattern is lowered and indexed to the fourth station where it is cleaned off with jets of air.

In the meantime, an air cylinder arm pushes the completed half mold out of the holding device to an electrically powered roller conveyor which moves it to position under an intermittently operating air jet. This jet blows sand out of the sprue and pouring cup on each cope.

Rockover of the drag is done by a device shaped roughly like a Z. It is pivoted at the center of the cross member and revolves in a vertical plane at 90 degrees to the upper wheeled conveyor. Each of the arms is a wheeled conveyor section. However, these sections have double sets of wheels between which the flask lip rolls. These conveyor sections align with the upper conveyor, containing copes and drags, and with a lower conveyor to which the drags are lowered. Thus copes at the upper level roll through the rockover and continue to the closing station.

Drags are stopped in the rockover device and held in place by friction type rollers which press against the flask lips on both sides. The rockover is rotated to place the drag in line with the lower conveyor, parallel and adjacent to the cope line. The 180-degree rotation places the other arm of the Z-shaped rockover, identical with the first, in position in the upper conveyor to receive the next drag.

At the lowered position the drags are pulled off the rockover device by an air cylinder arm. This movement also pushes another drag into the closing device. Between the rockover and the closing unit is a section of wheel conveyor holding two drags. When cores are required, they are set here.

Drag half of the closing device consists of a wheel conveyor section with brakes similar to those in the rockover for holding the flask in position. The conveyor section is mounted to a pivoting arm which is rotated 90 degrees counter-clockwise by an air cylinder. Meanwhile a similar device which, however, receives the flask on slides instead of wheels, rotates a cope from the upper conveyor to a position directly above the drag. This section also is lowered by air cylinder to the drag for the closing.

Pushed on Wheel Conveyor

The completed mold is pushed from the closing device by an air cylinder arm to a wheel conveyor placed at 90 degrees to the upper and lower cope and drag conveyors. Both halves of the closing device then return to starting position.

When two molds have emerged from the closing unit, they are pushed forward into the pouring station. A wheeled mold car then is raised by an air cylinder-operated platform to engage the molds and push them against a series of heavy iron rollers mounted in slotted beams. They act as weights during the pour. At this point the molds no longer rest on the conveyor, and the rear channel section containing roller wheels, being pivoted at the top, swings out of the way to permit the wheeled mold car to proceed into the cooling zone after the pouring operation.

Molds are in pouring position for 25 seconds. However, molds currently being produced can be poured in 9 seconds. One man in a small booth with large observation window does the pouring by pushbutton control. Since each half of the molding system produces two molds for pouring at the same time, provision has been made for simultaneous pouring of all four or any number up to four.

The 300-lb capacity pouring ladles are pivoted at the lips. A cable attached to a bail on each ladle is raised or lowered by hydraulic piston operating at 70 psi. Oil flow to the piston cylinder is controlled by solenoids through the pushbuttons.

After the molds are poured an air cylinder arm pushes the car on which they rest off the elevator to a cooling track. Molds remain under the weight rollers for a distance of two more car widths, allowing time for casting solidification. The hooded and vented

(*Concluded on page* 118)

WISCONSIN REGIONAL OFFERS

Full Program in Milwaukee, Feb. 10-11

Wisconsin Chapter of the American Foundrymen's Society is planning a full program for the 18th annual Wisconsin Regional Foundry Conference. Sponsored by the chapter and University of Wisconsin, it is scheduled for Feb. 10-11 at Hotel Schroeder, Milwaukee.

A general meeting will be held the morning of the first day, with four groups of sectional meetings planned for the remaining two days. Simultaneous sessions will be conducted on malleable iron, nonferrous, gray iron, steel and pattern subjects. Two luncheon sessions and the annual banquet complete the program.

P. C. Fuerst, the Falk Corp., Milwaukee, is conference chairman, with D. R. Hutchison, Nash-Kelvinator Division, American Motors Corp., Kenosha, Wis., serving as co-chairman. Advance registration is being handled by Bradley H. Booth. Carpenter Bros. Inc., Milwaukee 3.

Program details follow:

Thursday, Feb. 10

9 a.m.—**Registration**

10 a.m—Welcoming addresses: F. J. Dost, Sterling Foundry Co., Wellington, O., national AFS president; Dean Kurt F. Wendt, College of Engineering, University of Wisconsin.

10:40 a.m.—General Meeting: **"Common Sense for a Common Good,"** Arthur A. Agostini, Grede Foundries Inc., Milwaukee.

12 noon—Luncheon. **"Impressions of European Foundry Practice,"** C. V. Nass, Beardsley & Piper Division of Pettibone Mulliken Corp., Chicago.

2:15 p.m.—Sectional Meetings

Malleable Iron: **"Casting Defects as Related to Sand Practice,"** T. E. Barlow, Eastern Clay Products Dept., International Minerals & Chemical Corp., Chicago.

Nonferrous: **"Aluminum Castings and Their Connections,"** D. L. LaVelle, American Smelting & Refining Co., New York.

Gray Iron: **"Significance of Physical Testing of Gray Iron,"** Prof. P. C. Rosenthal, University of Wisconsin.

Steel: **"Quality Control in the Melting Department,"** P. A. Lawson, Harrison Steel Castings Co., Attica, Ind.

Pattern: **"Sealing Metal Coreboxes,"** Richard Olson, Dike-O-Seal Inc., Chicago.

4 p.m.—Sectional Meetings

Malleable Iron; **"Malleable Melting Controls,"** L. E. Emery, Marion Malleable Iron Works, Marion, Ind.

Nonferrous: **"Melting and Fluxing of Nonferrous Alloys,"** David Stein, Samuel Greenfield Co., Buffalo.

Gray Iron: **"Core Sand Practice—Fact or Fiction,"** O. J. Myers, Central Research Laboratory, Archer-Daniels-Midland Co., Minneapolis.

Steel: **"Further Studies on the Problem of Metal Penetration,"** Dr. R. C. Emmons, University of Wisconsin.

Pattern: **"Quality in a Pattern Shop,"** James M. Barrabee, International Harvester Co., Chicago.

6:30 p.m.—Banquet. **"Are Your Books Balanced?"** C. G. Arps. Allis-Chalmers Mfg. Co., Milwaukee.

Friday, Feb. 11

10 a.m.—Sectional Meetings

Malleable Iron: **"Annealing Problems Arising from Melting Irregularities,"** Prof. R. W. Heine, University of Wisconsin.

Nonferrous: **"Plaskon Resins Used in the Nonferrous Foundry,"** Dallac C. Auburn, Allied Chemical & Dye Corp., New York.

Gray Iron: **"Carbon as a Refractory,"** V. J. Nolan, National Carbon Co., New York.

Steel: **"Risering for Magnaflux Inspection,"** J. B. Caine, Cincinnati.

Pattern: (To Be Announced) A. F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee.

12 noon—Luncheon. **"Baseball, a Fulfillment of our American Dream,"** H. E. Goodnough, Milwaukee Braves.

2:30 p.m.—Sectional Meetings

Malleable Iron: **"Dielectric Core Ovens,"** W. H. Hickock, Girdler Corp., Louisville.

Nonferrous: Information Forum: D. L. LaVelle, David Stein, Dallac C. Auburn, M. E. Nevins.

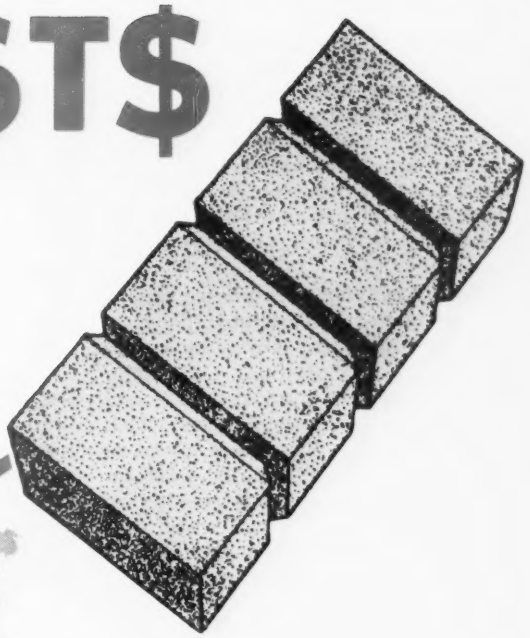
Gray Iron: **"A Review of Sand Bonding Processes,"** F. S. Brewster, Harry W. Dietert Co., Detroit.

Steel: Panel Discussion: **"Cleaning Room Practices,"** Stanley Lipinski, Pelton Steel Casting Co., Milwaukee; Stephen Kline, Crucible Steel Casting Corp., Milwaukee; Lloyd Olson, Bucyrus-Erie Co., Milwaukee.

Pattern: **"Pattern Equipment for High Pressure Molding,"** T. E. Barlow, Eastern Clay Products Dept., International Minerals & Chemical Corp., Chicago.

CUPOLA MAINTENANCE

GO---COT D O W N



WHEN YOU USE *Famous* CORNELL CUPOLA FLUX

Cut Scrap Loss—Get Better, More Uniform Castings with Fewer Rejects!

Many dollars are saved in cupola maintenance when you use Famous Cornell Flux. Digging out requires far less time and effort as drops are cleaner and bridging over is practically eliminated. The cupola lining will show much less erosion over a period of time due to a glazed or vitrified protective surface deposit on the brick or stone lining of the cupola.

Add Famous Cornell Cupola Flux to each cupola charge of iron and purge impurities so that you pour clean metal everytime. The iron is hotter and more fluid and sulphur is greatly reduced.

Many leading gray iron and malleable foundries with cupolas have found that the small amount they spend on Famous Cornell Cupola Flux is repaid hundreds of times over, being a more efficient, less costly cupola operation. Many of these users are near your foundry. We will be glad to have our representative call and tell you of their success with Famous Cornell Cupola Flux. Write now for Bulletin 46-B.

The Benefits - - - The Advantages of *Famous* CORNELL

Aluminum and Brass Flux

Makes metal pure and clean.

Permits use of more scrap without danger of dirt, porous places or spongy spots.

Thinner, yet stronger sections can be poured.

Metal does not cling to the dross.

Crucible or furnace linings are kept clean and preserved.

Cleanses molten brass even when the dirtiest brass turnings or sweepings are used.

Saves considerable tin and other metals.

Forms a perfect covering over the metal during melting, prevents oxidation and reduces obnoxious gases.

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The CLEVELAND FLUX Company

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Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes—Since 1918

FAMOUS CORNELL FLUXES

Trade Mark Registered

(*Concluded from page* 116)
cooling track holds 12 cars.

As a car is pushed onto the track, one is pushed off the opposite end to another elevator. At the top of its travel the molds are pushed off to a waiting platform to be moved to the cope removal station. The elevator lowers with the empty mold car to a return track below the cooling track level. An air cylinder arm pushes the empty car to the return track, and, in doing so, pushes a car at the other end onto the elevator which raises molds to pouring position.

An air cylinder arm pushes one of the completed molds into the cope removal station and moves the second mold into ready position. A clamping device lowers to grab the cope and pull it up into push-out arms which fit between the flask bars. Sand is pushed out to the drag. The grab device then moves forward, pushing an empty cope flask along a wheel conveyor to a vibrating unit, and sets the just-emptied flask on the conveyor. As the previous flask enters the vibrating unit the flask ahead of it is pushed to a rotating conveyor section which turns 90 degrees to line up with the conveyor feeding the molding machine.

As the cope flask is being processed, the drag is rocked over to line up with the drag-handling wheel conveyor. An air cylinder arm pushes the flask from the rockover to the pushout station where push-out blocks are lowered through the bar openings to push sand and castings to a lower level oscillating pan conveyor. Flasks are sequenced through a vibrator to a rotating conveyor section. The cope and drag rotating devices turn at the same time. When aligned with the molding machine feeding conveyor, the flasks are pushed off the rotating units by an air cylinder arm.

Sand and castings on the oscillating conveyors of both halves of the molding system feed a common vibrating shakeout. Castings come off the shakeout to a vibrating feeder which empties into an intermittently-run feeder at right angle to the first. The second feeder operates only when a three-sided box carried by an overhead monorail conveyor dips down in position to receive castings for transport to the spruing section.

Sand from the shakeout falls to a 24-in. belt conveyor and is carried over a magnetic pulley on its way to a bucket elevator which feeds the large storage hopper. As sand enters the hopper it falls on the apex of a V-shaped separating chute and is deflected to each end of the 100 x 27-ft storage hopper. Thus it is deposited above the points where sand is drawn out for the mullers in each half of the molding system.

Bentonite delivered to the foundry in bags is raised by elevator from ground floor level to an upper working level where men empty the bags into chutes feeding the bond storage hoppers.

Exhaust lines from the cooling hoods and the shakeout culminate in a recirculating wet-type collector. Sludge from the collector is deposited in dump buckets hauled away periodically by fork trucks.

Molding units in the system were furnished by the Osborn Mfg. Co., Cleveland. Other suppliers of major equipment include National Engineering Co., Chicago (sand preparation); Haylco Controls Corp., Neenah, Wis. (sand controls), and Simplicity Engineering Co., Durand, Mich. (shakeout).

Meetings of Interest to Foundrymen

Jan. 21—Malleable Founders' Society, general meeting, Hotel Cleveland, Cleveland.

Jan. 24-27—American Management Association, midwinter general management conference, Hotel Statler, Los Angeles

Jan. 24-27—Plant Maintenance & Engineering Show, International Amphitheater, Chicago. The **Plant Maintenance & Engineering Conference** will be held concurrently, also in the International Amphitheater

Jan. 24 28—American Society of Heating and Ventilating Engineers, 12th International Heating and Ventilating Exposition, Commercial Museum and Convention Hall, Philadelphia. The 61st annual meeting of the society will be held simultaneously

Jan. 27—National Industrial Relations Conference, Biltmore Hotel, Dayton, O.

Feb. 10-11—Wisconsin Regional Foundry Conference, Schroeder Hotel, Milwaukee

Feb. 14-17—Industrial Ventilation Conference, Michigan State College, East Lansing, Mich.

Feb. 14-18—American Institute of Mining and Metallurgical Engineers, annual meeting, Conrad Hilton Hotel Chicago

Feb. 17-18—Southeastern Regional Foundry Conference, Tutwiler Hotel, Birmingham

Mar. 9-10—Foundry Educational Foundation, college-industry conference, Hotel Cleveland, Cleveland

Mar. 14-15—Steel Founders' Society, annual meeting, Drake Hotel, Chicago

Mar. 25-26—California Regional Foundry Conference, Huntington Hotel, Pasadena, Calif.

Mar. 28-Apr. 1—American Society for Metals, ninth Western Metal Congress and Western Metal Exposition. Pan-Pacific Auditorium, Los Angeles

Apr. 7-8—Malleable Founders' Society, market development conference, Edgewater Beach Hotel, Chicago

May 16-20—Sixth National Materials Handling Exposition, International Amphitheater, Chicago

May 23 27—American Foundrymen's Society, 59th annual convention, Houston, Tex.

May 31-June 3—Basic Materials Exposition, Convention Hall, Philadelphia

June 16-18—Malleable Founders' Society, annual meeting, The Greenbrier, White Sulphur Springs, W. Va.

Sept. 6-17—National Machine Tool Builders Association, machine tool show, International Amphitheater, Chicago

Sept. 6-17—Production Engineering Show, Navy Pier, Chicago

Oct. 6-7—National Foundry Association, annual meeting, Edgewater Hotel, Chicago

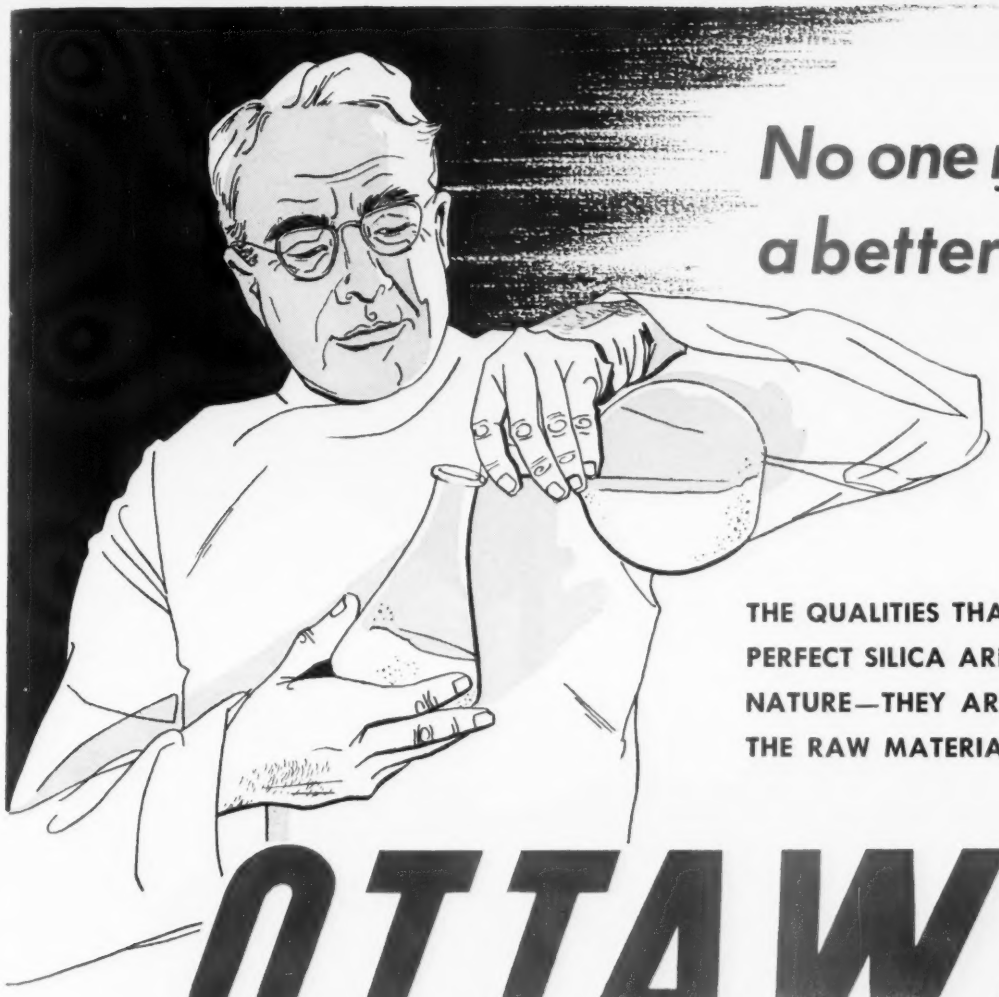
Oct. 13-15—Foundry Equipment Manufacturers Association, annual meeting, the Greenbrier, White Sulphur Springs, W. Va.

Oct. 16-21—Gray Iron Founders' Society, annual meeting, Schroeder Hotel, Milwaukee

Oct. 17-18—American Coke & Coal Chemicals Institute, annual meeting, The Greenbrier, White Sulphur Springs, W. Va.

Oct. 17-21—American Society for Metals, national metal exposition and congress, Convention Hall, Philadelphia

Dec. 7-9—American Institute of Mining & Metallurgical Engineers, electric furnace steel conference, Hotel William Penn, Pittsburgh



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Few areas of the earth's surface contain silica deposits to equal those which exist at Ottawa, and few indeed are the refining processes to equal that which Ottawa Silica Company employs to insure you one of the finest products in the world. This plus increased mill capacity, and excellent transport facilities, marks Ottawa Silica Company as the nation's foremost supplier of high grade silica products.

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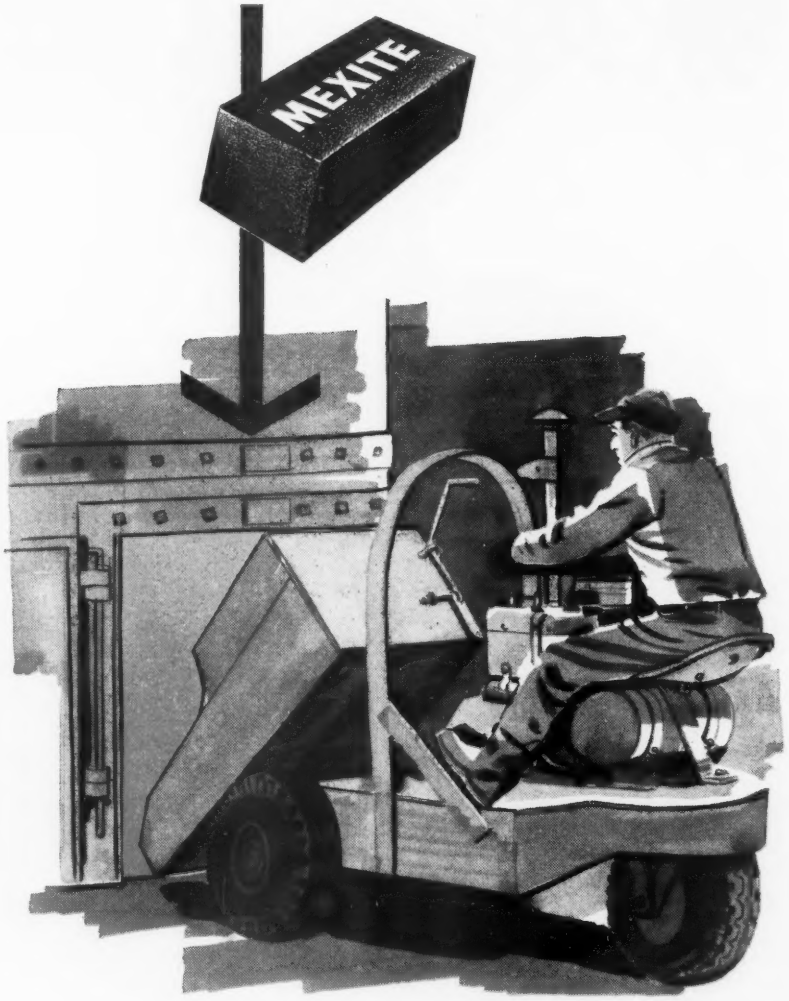

MEXITE briquettes, composed of 70% graphitic carbon, provide foundrymen with a positive method of raising and stabilizing the carbon content of cupola charges and at the same time reduce the cost. Larger amounts of scrap can be used with resultant savings in charging costs. For example, if 400 lbs. additional scrap is charged, four MEXITE briquettes will retain the same carbon analysis at a savings of $3.06* per ton of charge.

MEXITE helps produce better castings because they permit accurate carbon control. MEXITE helps assure lower chill and hardness, and provides better fluidity and machinability thus increasing useable metal yield and cutting scrap loss. MEXITE briquettes are packed 90 lbs. to a carton for easy handling and storing. We'd like to show you what MEXITE can do in your foundry . . . write us today for a specific recommendation made for your particular area. We'll also send along our newest bulletin that will show you how MEXITE can help keep your costs down where you want them to be.

** Based on average current pig iron and scrap prices*

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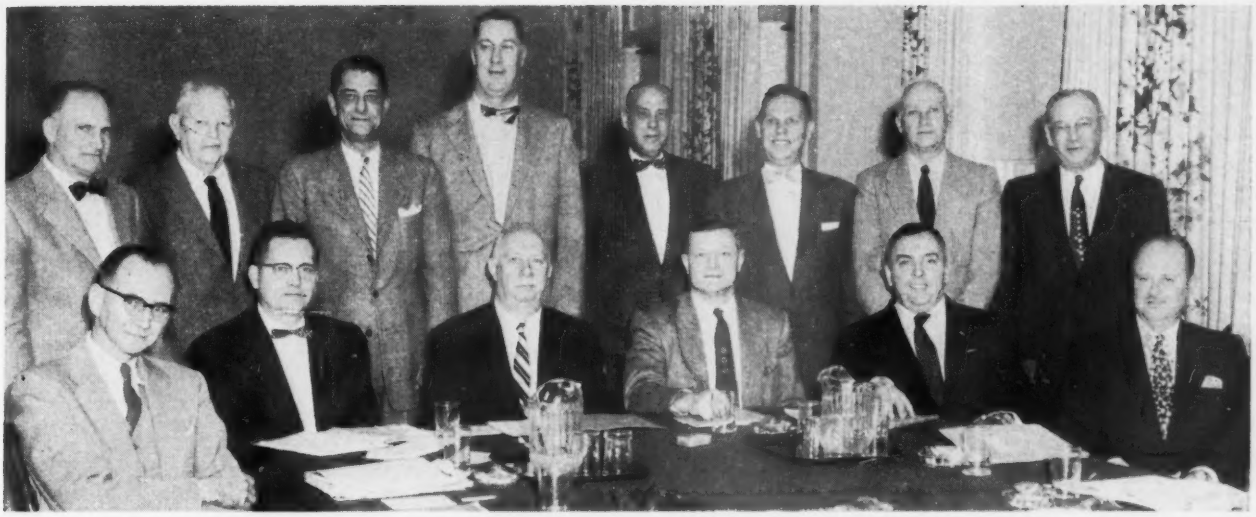

GIFS officers and directors. Standing, left to right: R. G. Schaefer, E. T. White, W. E. Illig, A. M. Nutter, G. L. Nimocks, E. M. Knapp, J. C. Alberts, C. H. Meminger. Seated: W. S. Brunk, D. H. Workman, H. J. Trenkamp, C. H. Ker, W. O. Larson, E. L. Roth

GRAY IRON FOUNDERS' SOCIETY

Meets To Discuss Industry Problems

By WILLIAM G. GUDE
Managing Editor

AN INTERESTING program of subjects of concern to foundry management was presented at the 26th annual meeting of the Gray Iron Founders' Society. The meeting, held Nov. 11-12 at the Homestead, Hot Springs, Va., was well attended, with a registration of more than 250.

In the annual election of officers C. H. Ker, president, Dalton Foundries Inc., Warsaw, Ind., was chosen president to succeed Henry J. Trenkamp, president, Ohio Foundry Co., Cleveland. J. W. Simmons Jr., secretary-treasurer, Cox Foundry & Machine Co., Atlanta, was named vice president. C. H. Meminger, manager, Foundry Division, Posey Iron Works Inc., Lancaster, Pa., is the new secretary, and Walter O. Larson, president, W. O. Larson Foundry Co., Grafton, O., was re-elected treasurer. Donald H. Workman was reappointed executive vice president of the society.

New directors elected for three-year terms are: Albert M. Nutter, treasurer, E. L. LeBaron Foundry Co., Brockton, Mass.; W. E. Illig, executive vice president, Banner Iron Works, St. Louis; E. T. White, president, Bostick Foundry, Lapeer, Mich., and R. G. Schaefer, Schaefer-Goodnow Foundries Inc., Pittsburgh, an incumbent director.

Opening session, presided over by

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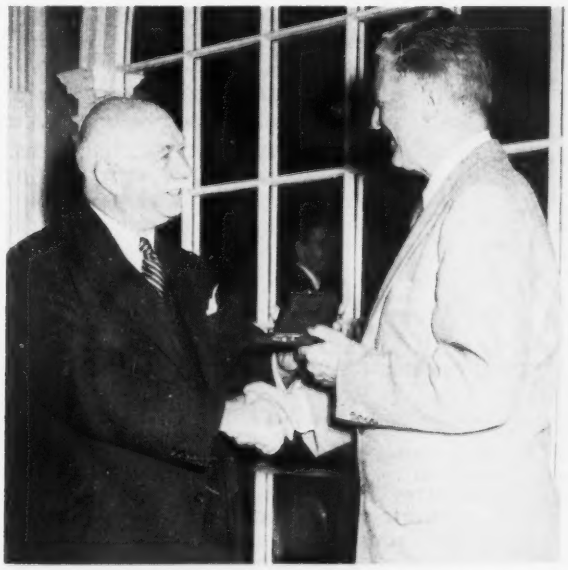
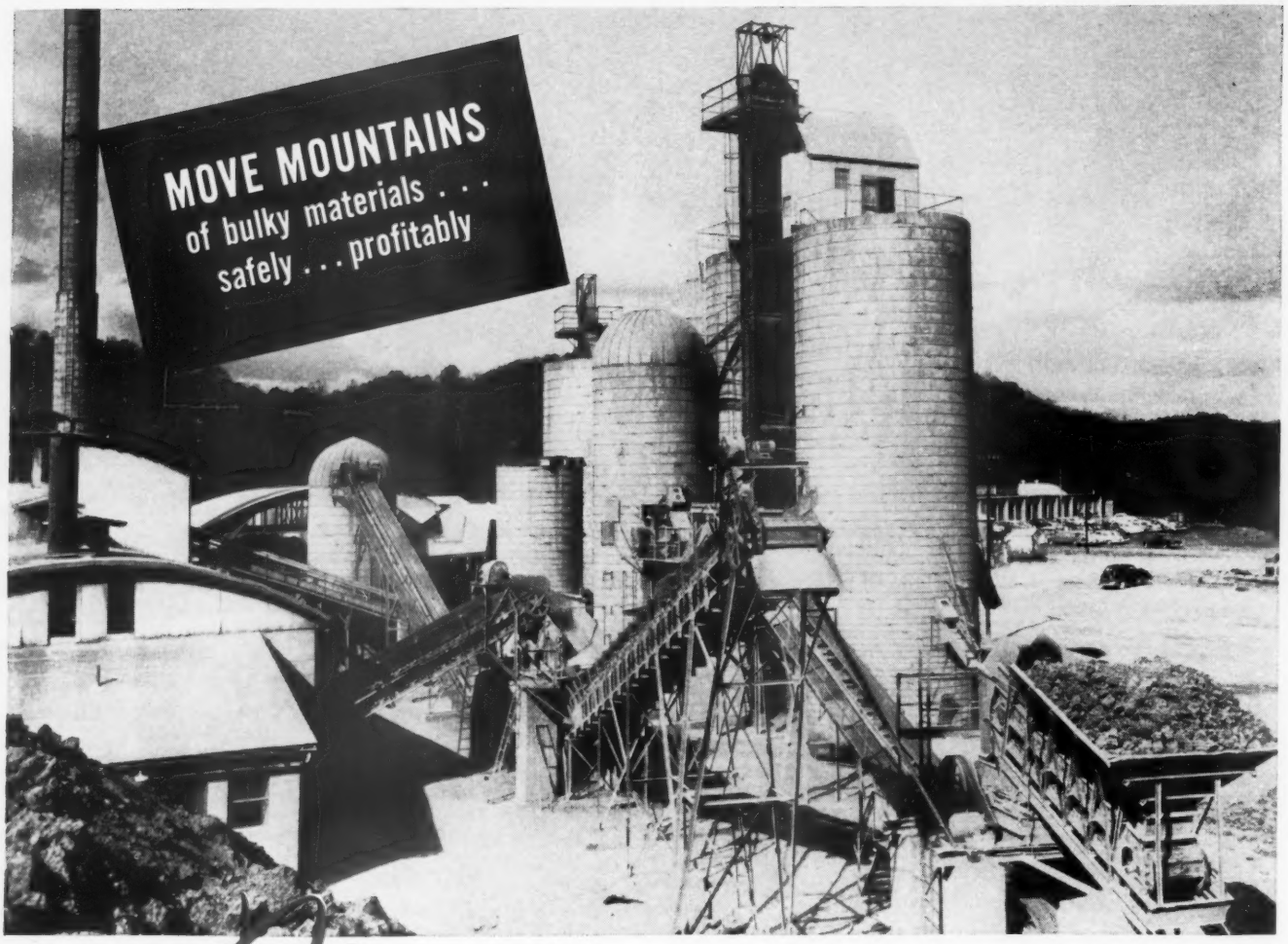


H. L. Edinger, right, receives the society's Gold Medal from President Henry J. Trenkamp

Elected officers were, left to right: C. H. Ker, president; W. O. Larson, treasurer, C. H. Meminger, secretary



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Your Marietta System will be engineered to perform every storage and materials-handling task your plant requires, with any type of intake or discharge or mechanical handling system that will expedite your operations. Any feature desirable can be provided . . . shakers, screens, live storage shelves . . . and the extra factor of strength built into Marietta Concrete Storage Silos makes it possible to mount heavy equipment on top or sides whenever needed.

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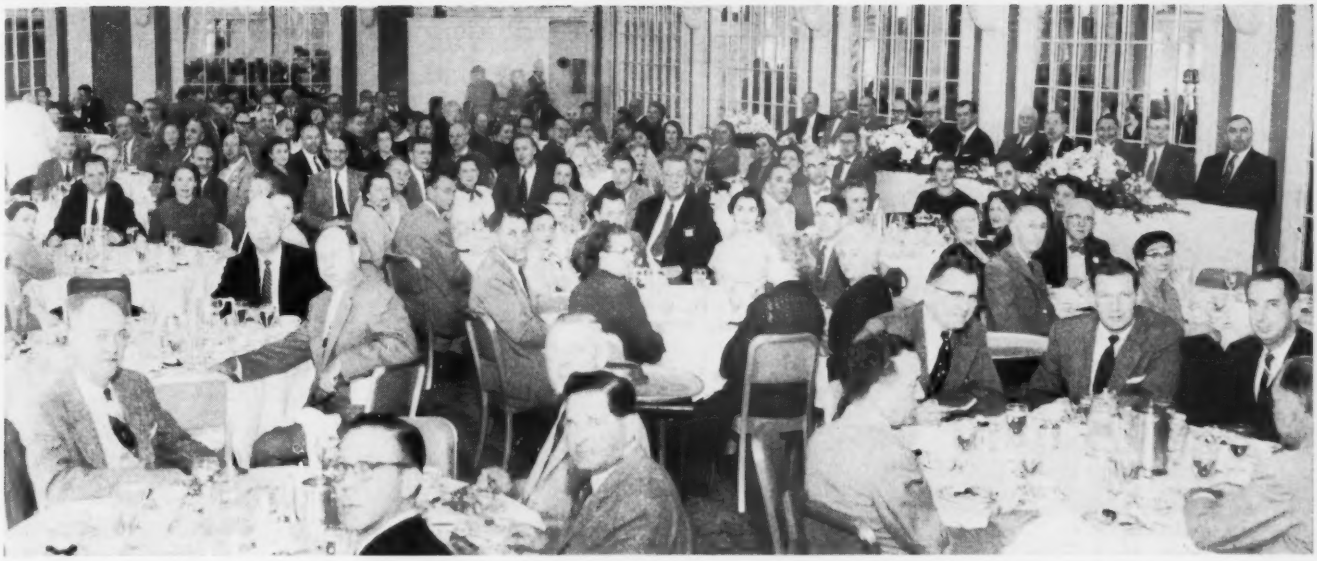


One of the two industry luncheon sessions held during the annual meeting

(*Continued from page* 121)

President Trenkamp, was devoted to reports by officers and committees. Donald H. Workman, executive vice president, mentioned some of the high lights of the past year's activities. These included issuance of the society's Cost Manual No. 2; establishment of two new cost groups in Texas and the Southeast, bringing the total to 19; completion of the first statistical survey of the industry; publication of a booklet on heat treating of gray iron, and the addition of 23 new members, making the society's total membership about 500.

Charles F. Walton, technical director, described briefly the various technical activities of the society. He said that the next chapter to be prepared for the forthcoming *Gray Iron Handbook* will cover gray iron properties. This will be followed by one on design.

C. R. Culling, president, Carondelet Foundry, St. Louis, reported for the Program Evaluation Committee. This committee, formed a year ago, acts in an advisory capcity to the board in reviewing current activities and making recommendations for future action. Subjects under study recently have included publicity and promotion, market research and product development.

Speaking at a luncheon session, Wendell B. Barnes, administrator, Small Business Administration, Washington, explained the ways in which the SBA can help small companies. These include assistance in obtaining capital, a fair share of government orders and advice on management problems. He pointed out that most loans are made with bank participation. Requirements of the borrower include good character, ability to operate successfully, prospects that indicate repayment of the loan likely, and sufficient capital to operate on a sound basis.

A panel discussion of insurance subjects occupied one session. Peter E. Rentschler, president, Hamilton Foundry & Machine Co., Hamilton, O., was moderator. "Product Liability Insurance" was described by James O. Honeywell, New Amsterdam Casualty Co., Baltimore, as protection in event of an accident resulting from failure of a product. However, it does not cover damage to the product itself.

Speaking on "Bailee Legal Liability Insurance," George V. Whitford, Fire Association of Philadelphia, explained its application to customers' patterns while in the foundry's hands. Even though the customer insures his patterns, the foundry could be held liable for their loss through fire or other causes if it were proved that the loss resulted from the foundry's negligence. Bailee legal liability insurance protects the foundry in such an event.

Considerable interest in the subject of insurance was evidenced by the number of questions asked the speakers. The Gray Iron Founders' Society has been active the past year in collecting and disseminating information to its members relative to the protection afforded foundries by the various types of available insurance.

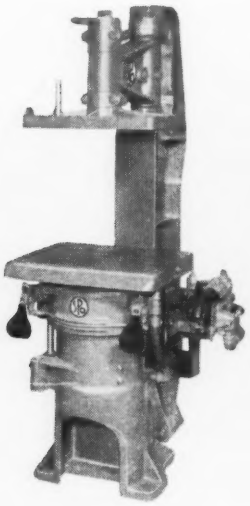
Consumption of gray iron castings has lagged behind the expansion in the metalworking industry as a whole, it was stated by N. R. Ladabouche, market research manager, *Steel* magazine, Cleveland. He pointed out that per capita consumption of rolled steel increased from 880 pounds in 1947 to 1007 pounds in 1953; during this period gray iron consumption per capita dropped from 175 pounds to 171 pounds. Moreover, sales of the entire metalworking industry increased 104 per cent the last seven years in dollar volume while sales of gray iron

(*Concluded on page* 126)

New directors elected by the society. Left to right: A. M. Nutter, W. E. Illig and E. T. White. R. G. Schaefer was re-elected a director

. . . FOR MODERNIZATION

to meet the needs of the *Changing Foundry*



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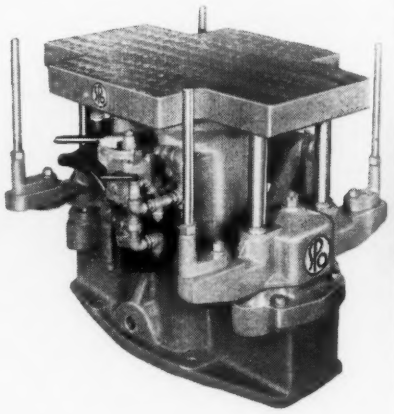
JOLT-SQUEEZERS . . . for small precision molds. This post-type Model 110-P can be supplied with 10, 13 or 14-inch squeeze cylinders.



Model 3070

JOLT PIN LIFTERS . . . for diversified production operations. SPO Series 3000 units have jolt capacities from 750 to 4000 pounds.

. . . FOR AUTOMATION

SPO is the recognized leader in the development and production of fully-automatic molding machines. A steadily growing backlog for the already famous SPOMATIC speaks for itself. Leading high-production foundries are converting existing plants . . . or creating new facilities . . . to take advantage of the remarkable economies and increased production possible through automation. To meet the diversified needs of these foundries, SPO is developing improved equipment, including a line of smaller machines for foundries that do not require fully-automatic molding units of the SPOMATIC type.

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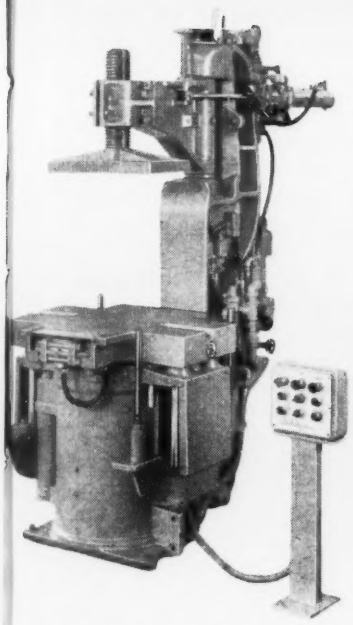

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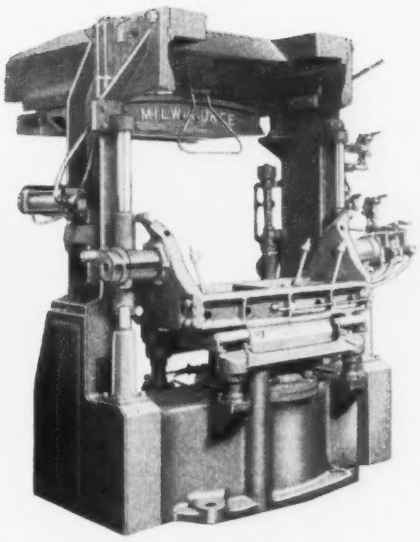
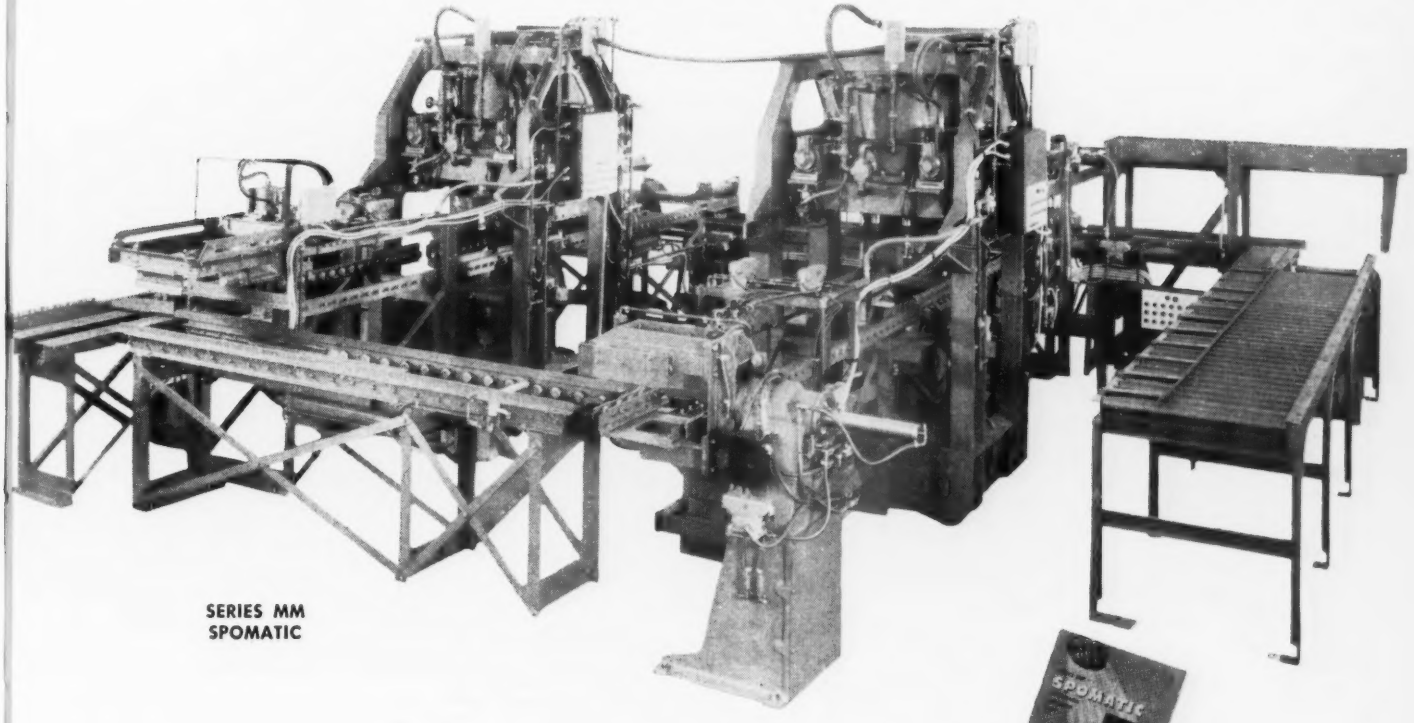
JOLT - SQUEEZE - STRIP/DRAW MACHINES . . . featuring fully automatic controls and pushbutton operation. Available with 13, 14 and 16-inch squeeze cylinders.



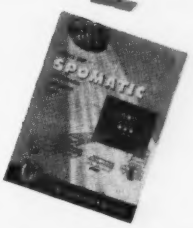
Model 217

JOLT-SQUEEZE-ROLLOVER-DRAW MACHINES . . . combine all operations in simplest possible operating cycle for fast production of drag molds. Can be supplied with 16, 21 and 30-inch squeeze pistons.

The importance . . . in fact, the necessity . . . of improving existing facilities is recognized by progressive foundrymen. In spite of the growing popularity of fully-automatic molding operations in large high-production foundries, the jobbing foundry will continue to pour tremendous annual tonnages with semi-automatic and manually operated molding machines. These foundries . . . to stay competitive . . . need machines of improved design that will produce precision molds for years with minimum maintenance and replacement. ONLY SPO has a complete line of performance-proven equipment to meet the needs of every jobbing foundry



SERIES MM
SPOMATIC



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(*Concluded from page* 123)
rose only 44 per cent.

Mr. Ladabouche recommended that the gray iron industry push a co-operative marketing program that would 1) study industrial end products to determine where and why gray iron castings should be used, 2) undertake an aggressive advertising and publicity job, 3) continue to develop an educational program for engineers and 4) intensify product research and development work.

Operation of a product development program was explained by Ross L. Gilmore, president, Superior Steel & Malleable Castings Co., Benton Harbor, Mich. Mr. Gilmore, who is chairman of the Product Development Committee of the Steel Founders' Society of America, said that his company employs a staff of three—engineer, technician and draftsman—in this work. Generally the design of a part starts with a sketch; next a model is made and a sample piece is cast. The casting is coated with brittle lacquer and tested to disclose stress concentration. This test is useful in dictating design changes. Slides were shown to illustrate the design and redesign of various castings.

Mr. Gilmore pointed out that foundries lose markets because of product quality, cost or both factors. Furthermore, quality demands by consumers are greater today because modern devices make it easier than formerly to detect inferior quality.

Setup and function of the Business and Defense Service Administration was described by Paul W. Vandenberg, on leave from the Crane Co. as chief, Castings Branch, Iron and Steel Division. He said that the Department of Commerce wants the advice and help of industry, but that the ferrous foundry industry has been slow to co-operate in furnishing the manpower needed to staff its particular department in BDSA. He also discussed efforts of consumers to stem the rising trend of iron and steel scrap exports; most scrap dealers as well as users favor some form of restrictions on exports, but as of that time no agreement had been put into effect concerning a ceiling on such shipments.

A moderately optimistic view of 1955 business prospects was expressed by Martin R. Gainsburgh, chief economist, National Industrial Conference Board, at the luncheon concluding the meeting. He pointed to signs of an upturn in recent months and added that 1954 actually will shape up as a good year with gross national product off only about 4 per cent from the 1953 peak of $370 billion.

Leading economists, he said, look for these high lights in 1955 compared with 1954: Gross national product up 2 to 3 per cent; Federal Reserve Board index of industrial production up 5 to 8 per cent; steel production about the same as 1952; construction work up $2-$4 billion; farm income down 3 to 4 per cent; automobile production unchanged or better; increased production of household appliances.

This luncheon was the occasion for the making of awards in the society's redesign contest and the presentation of citations to individuals for service to the GIFS and the gray iron industry. First-prize winner of $500 in the redesign contest was William S. Thomas, vice president, Emmaus Foundry & Machine Co., Emmaus, Pa. Second prize of $250 went to Russell W. Henke, chief mechanical engineer, Research and Development Division, Badger Meter Mfg. Co., Milwaukee. Paul C. Nelson, chief engineer, O'Neil-Irwin Mfg. Co., Lake City, Minn., won third prize of $100.

Honorable mentions were awarded L. R. Kells and C. Hempfing, R. H. Sheppard Co., Hanover, Pa.; C. W. Gilchrist, Cooper-Bessemer Corp., Mount Vernon, O.; J. J. Laudig, research engineer, Delaware, Lackawanna & Western Railroad, Scranton, Pa.; Paul B. Dinkel and Peter Dudyak, Eberhard Mfg. Co., Cleveland, and A. J. Schnipper, vice president, Excelsior Foundry Co., Belleville, Ill.

The society's highest award—its gold medal—was presented to H. L. Edinger, president, Barnett Foundry & Machine Co., Irvington, N. J. This was in recognition of his outstanding contributions to the society and the gray iron industry generally. Still active in society affairs, Mr. Edinger has served it as president, vice president, director and chairman of the Cost and Technical Committees. He was a member of the Gray Iron Industry Advisory Committee to the Office of Price Administration during World War II and Office of Price Stabilization during the recent war in Korea.

Citations for unusual service to the society were presented to: Walter O. Larson, president, W. O. Larson Foundry Co., Grafton, O.; E. M. Knapp, president, Ferro Machine & Foundry Inc., Cleveland; John E. McIntyre, vice president and general manager, Sibley Machine & Foundry Corp., South Bend Ind., and William A. Morley, superintendent, Olney Foundry, Link-Belt Co., Philadelphia.

METAL FINISHERS MEET: More than 2500 production men attended the first national Metal Finishing Show and Conference, held in Chicago Nov. 16-19 at the new Behr-Manning headquarters and warehouse. At the show, 38 manufacturers displayed 72 new machines which use coated abrasive belts, and 50 technical specialists conferred with visitors, who brought workpieces of many kinds to be polished on the apparatus

American Nuclear Society Plans Meeting

American Nuclear Society, the world's first professional society of scientists and engineers engaged in nuclear technology, has recently been organized to foster the advancement of nuclear science and technology. The organization will hold its first technical conference June 27-29 at Pennsylvania State University, State College, Pa. Primary interest of the society will be nuclear power technology; other subjects of interest to the membership included uses of radioisotopes in science and industry and effects of radiation on materials.

Says Hermann Good,
Foundry Manager
at Textile Machine Works___

"We have used Tabor Cut-Offs nearly eight years and know they're the kind of cut-off we want at TMW—they're fast, precise and trouble-free."

15 hp Tabor-Brasive Cut-Off Machine in use at Textile Machine Works, Foundry Division, Reading, Pa. The Tabor machines greatly reduce snagging and finish-grinding costs.

Hermann P. Good has been Foundry Manager at Textile Machine Works for the past 15 years, and has been with the company for 23 years.

"TMW Foundry's mechanized facilities set a fast pace, but the Tabor Cut-Off machines never slow us down."

Tabor-Brasive Cut-Off Machines make fast, clean cuts, close to the casting. They cut through 2" dia. gates and risers of pure nickel in 12 seconds and can handle tough materials like nodular iron and titanium. They are easy and safe to work with — the operator gets a good view of work being cut. Because these Tabor machines have adjustable, precision bearings, the spindle can be kept free of end-play year after year. And because Tabor-Brasive Cut-Off Machines are exceptionally durable and trouble-free, they cut carloads of castings at pennies for maintenance.

Units range from 5 hp to 20 hp. On machines 7½ hp and larger, the cutting head can be swung to the side for handling large work. Write for Tabor literature today.

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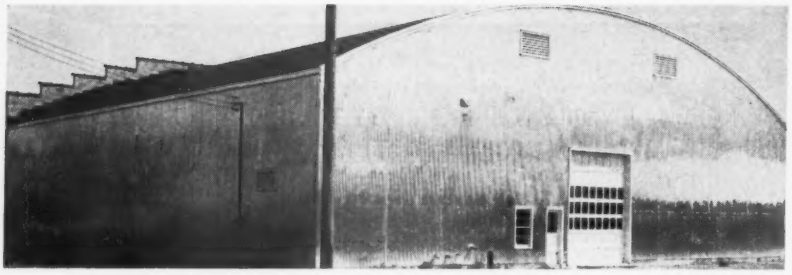

Corrugated aluminum siding forms walls of the completed building shown on the left. Picture on right shows trusses which were prefabricated and shipped knocked down

Cuts Pattern Handling Costs

With New Storage Building

By BYRON E. KENNEL
Assistant Editor

TO FACILITATE the economical handling of the many patterns required by its foundry, the Minster Machine Co., Minster, O., recently constructed a new pattern storage building. Storage area previously had been supplied by several buildings which originally had been intended for other uses. These structures were never well suited to pattern storage and a comparatively high handling cost resulted.

The company, founded in 1896, is a leading builder of mechanized power presses. While it has a standard line of presses ranging in capacity from 15 to 1200 tons, many of the machines manufactured by the company are modified to meet a customer's specifications. Consequently, short runs of from one to ten pieces are the rule in the foundry and a large investment in patterns and extensive storage space are required.

Low initial cost and minimum maintenance and insurance charges characterize the type of building erected. It is a three-story wooden beam structure, 90 ft wide, almost 94 ft long and 32 ft high at the center line of the trusses to the floor. Combined floor space is 22,460 sq ft. Total cost of the building, lot and sprinkling system was approximately $45,500.

Corrugated aluminum siding covers two sides and one end of the building. The rear of the building is made of 12 in. cement blocks which will serve as a fire wall in case of future expansion. Land is available to duplicate the building on the other side of the fire wall. Sheathing is of ⅝-in.-thick plywood and is covered with

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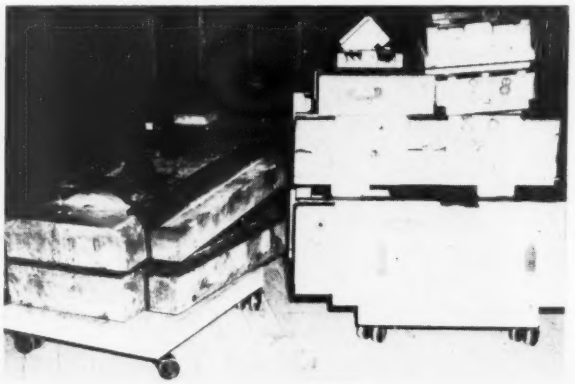
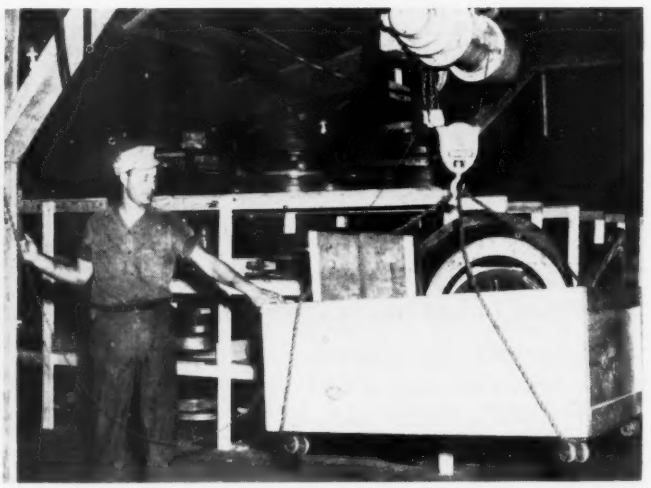
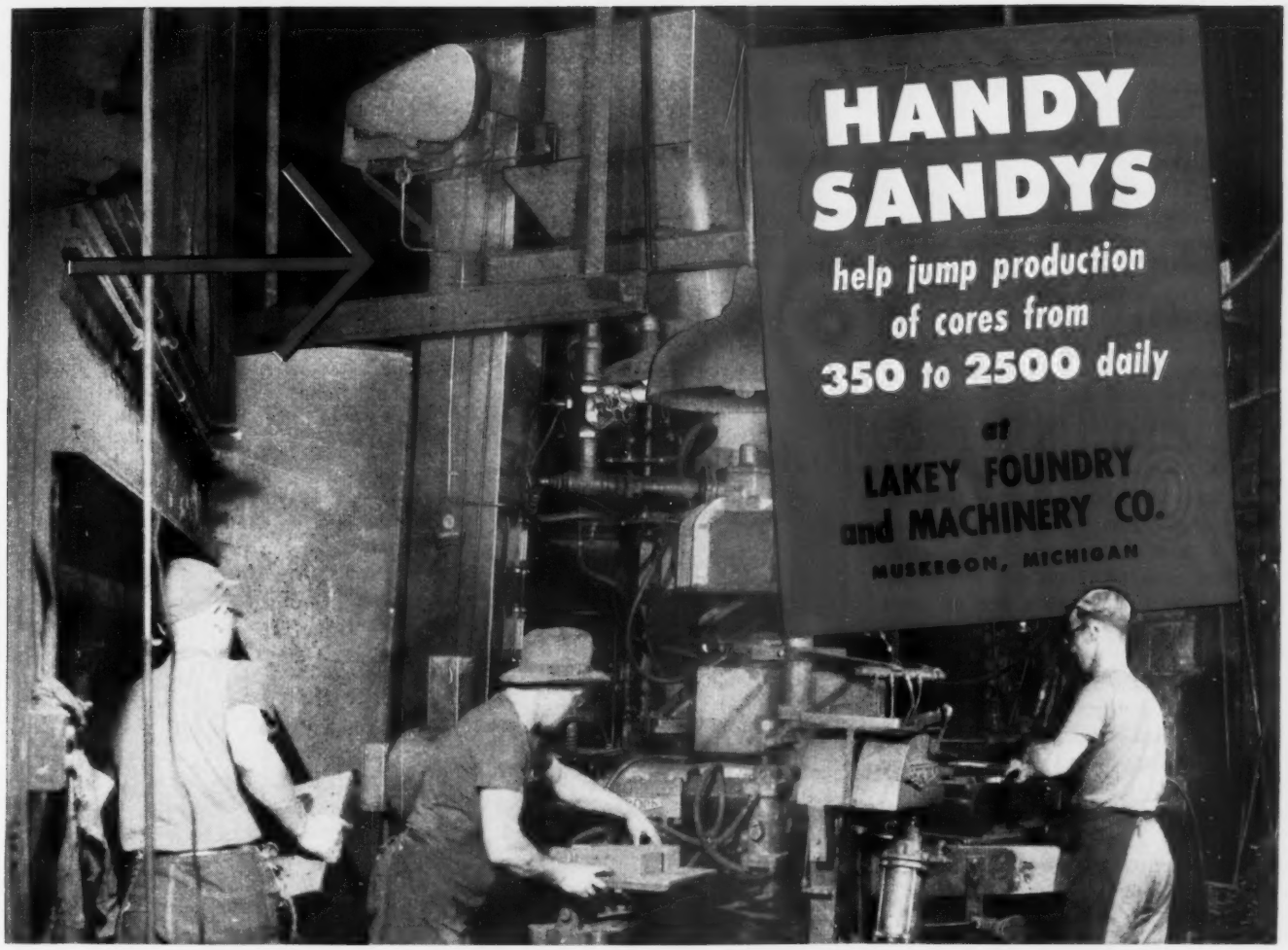


Medium sized patterns are stored on 28 x 36-in. platforms on second floor. Patterns go to foundry on platforms

Large patterns and coreboxes are stored on first floor before going to foundry on 4 x 5-ft platform



Small patterns are lowered from third floor in box by 1-ton hoist. Box is moved to foundry by truck



"GOOD CORES HELP MAKE GOOD CASTINGS"

The Lakey Foundry and Machine Company had the problem of how to turn out better cores in greater numbers, faster and at less cost. The cores had been made by hand ramming, with one man making up to 350 cores per 8-hour day.

A Newaygo Handy Sandy was installed in conjunction with a Rotary Core Blower, and with three men working on the unit, production was stepped up to well over 300 cores per hour, or at least 2,500 cores per 8-hour day.

A second Handy Sandy was then installed to operate with a large Core Blowing Machine and a Core Rollover, which when in full production blows cores at 100 cores per hour with one man as compared with the hand method of 45 per hour per man. The cores average from 14 to 50 lbs. each.

While we have only recently introduced Handy Sandy units for use with blowing machines, acceptance has already been proved by the fact that such outstanding foundries as General Electric Company, Schenectady, New York; Mueller Company, Chattanooga, Tennessee; James B. Clow, Coshocton, Ohio; Goulds Pumps, Inc., Seneca Falls, New York; Lakey Foundry and Machine Company, Muskegon, Michigan and other prominent foundries have purchased either the standard or Super Handy Sandy units designed especially for their existing core blowing machines.

The primary purpose of the Handy Sandys in these installations is to provide core sand for high production core blowing at low cost. The units are practically maintenance free, and being full automatic, eliminate hand ramming and shoveling of any type. Standard Handy Sandy units will supply core machines with up to 6 tons of sand per hour, while the Super Handy Sandys are now available with a maximum of 30 tons per hour.

A copy of "Planned Mechanization for Foundries" is yours for the asking. Write, wire, or phone today.

NEWAYGO | **engineering company**
NEWAYGO, MICHIGAN
Manufacturers of Neway® Mold Handling, Sand Handling and Conditioning Equipment

(*Concluded from page* 128)

built-up roofing. A manually operated overhead door, 12 ft wide and 14 ft high, is located at the entrance of the building. Provision has been made to install a similar door in the rear of the building when expansion takes place. Louvers placed at various points provide cross-ventilation. The trusses were prefabricated on the West coast and shipped knocked down. The bottom members are 15 x 6 in. and made of clear fir.

Large patterns and coreboxes are stored on the first floor, which has an area of 8370 sq ft. This floor is made of reinforced concrete approximately 5 in. thick.

Posts which support the second floor are 10 x 10 in. native timbers. The second floor joists are covered with 2 x 6 in. grooved fir flooring. Medium size patterns are stored on the second floor, which has an area of 8274 sq ft.

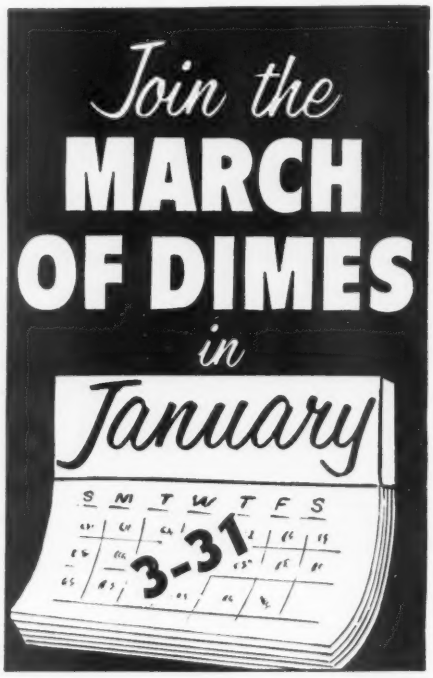
Supports for the third floor are 6 x 10 in. native timbers. The flooring is of 1 x 6 in. fir. The floor area of the third floor is 5772 sq ft. Shelved racks have been installed on the third floor to provide convenient storage space for small patterns. The shelves are at a convenient height so that the patterns may be placed in the rack by hand.

Larger patterns are stored on 4 x 5 ft wheeled platforms, which can be moved with an inexpensive hand lift truck. Medium size patterns are stored on 28 x 36 in. platforms equipped with four casters. The medium as well as the larger size patterns remain on their platforms until they reach the foundry and are replaced on them when they are brought back to storage. Small patterns and coreboxes are placed in 3 x 4 x 2 ft high boxes for hoisting up and down from the third floor.

An automotive truck is used to transport the patterns on their platforms to the foundry, which is approximately one city block away from the pattern storage building. A 1-ton hoist is located at the top of the third floor in an open shaft behind the overhead door of the pattern storage building. It is used to lift patterns off the truck, hoist patterns to the correct floor and to lower patterns to the waiting truck when they are needed in the foundry. Should the amount of pattern handling require it, the hoist can be replaced by an elevator.

Wiring of the building is BX cable or in conduit. All lights can be turned on and off from a panel on the first floor as well as on the second or third floor. A caution light on the panel will remain burning until all the lights are turned off. Fire protection is provided by the sprinkler system and by hand-operated fire extinguishers placed on each floor. All patterns are insured, and those which are sent to outside foundries are covered by a floater policy.

An office room, 10 x 10 ft, located near the entrance on the first floor has been provided to keep records for all of the company's patterns. The pattern record system at Minster Machine Co. is designed to tell the location of a pattern at any time, be



it in storage, in the pattern shop, in their own foundry or in an outside foundry. A card system shows the dates on which patterns are taken out and received in storage.

The company maintains its own pattern shop. Each woodworking machine is connected to a dust collection system. Patternmakers work in the front section of the building and the rear section is used for pattern lumber storage. Almost all of the patterns used in the foundry are made of wood.

About 100 of the plant's 440 employees work in the foundry, pouring 30 to 35 tons of high-tensile gray iron daily. Hot metal is provided by a 54-in. cupola melting at the rate of 10 tons per hour. The cupola is the front slagging type. Slag falls into a stream of running water and flows to a bin from which it is disposed of after each day's operations. Pouring of molds starts in the early afternoon and is completed in approximately four hours. This provides sufficient time to repair the cupola lining in time for the next day's run. Patching is done with a pneumatic gun.

Coke and sand come into the foundry on the same belt conveyor. The sand is diverted by a plow onto another conveyor which takes the sand to storage bins located inside the foundry. The coke is stored in an overhead hopper located in front of the cupola. A self propelled crane equipped with an electro-magnet makes up the metal charges by releasing them in a weigh hopper. Coke is dropped from the storage hopper into the coke weigh hopper and then into a cone bottom charging bucket. Limestone and flux are added by hand and the charging bucket is sent mechanically to a location beneath the hopper where the metal charges have been made. The metal charge is released and the complete charge is sent to the cupola. Only two men are required for the complete operation.

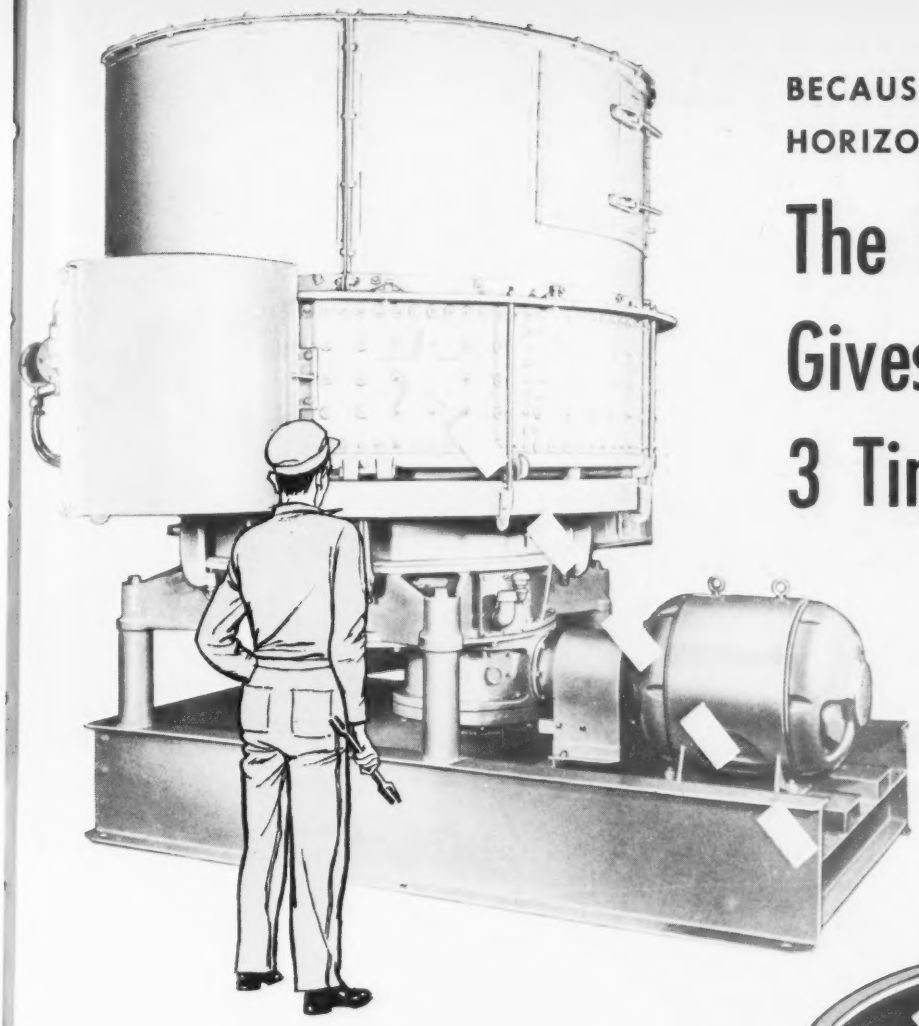
Large castings, up to 13 tons, are produced in the foundry. Molding methods used include both pit and floor molding, with several smaller castings often made in one floor mold. Gas burners are used to skin dry all molds. The entire foundry operation is characterized by mechanized material handl ng, molding craftsmanship and low scrap.

Apprenticeship Program Operation Described

Steps in establishing and placing in operation of a comprehensive apprentice training program are explained in the 1954 edition of "Setting Up an Apprenticeship Program" published by the U. S. Department of Labor. Other items covered are the benefits of the G. I. Bill and Selective Service regulations as they apply to apprentices. Copies of the booklet are available free of charge from the Publications Branch, Bureau of Apprenticeship, U. S. Department of Labor, Washington 25, D. C.

Booklet Describes Need For Quality Control

Quality control and research and their value to a company are described in a booklet, "Quality Control and Research—Insure Your Product in Tomorrow's Market," published by the Scientific Apparatus Makers Association, 20 North Wacker Dr., Chicago 6. Particular attention is paid to the use of quality control and research in small plants. Ways are given to introduce these programs. Copies of the booklet are available at 25 cents each when requested on a business letterhead.



BECAUSE OF B&P's EXCLUSIVE HORIZONTAL MULLING PRINCIPLE

The Speedmullor Gives More Than 3 Times the Mulling

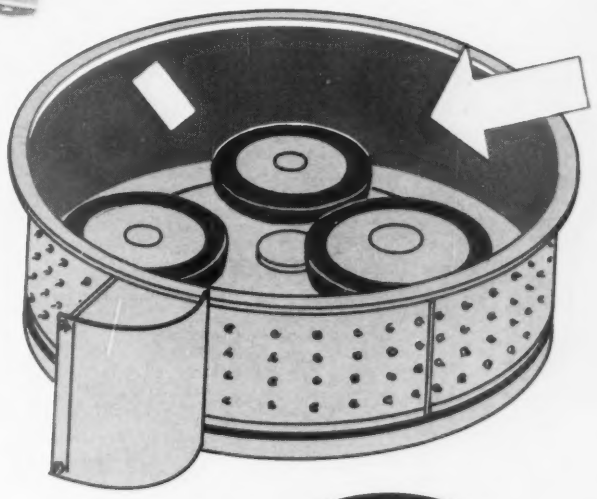
210,000 SQ. INCHES OF MULLING AREA COVERED EVERY MINUTE IN THE 80A

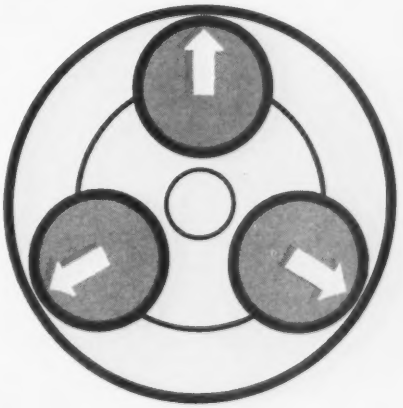
The mulling wheels of the new 80A Speedmullor cover 210,000 square inches of mulling area every minute . . . that's nearly three times the mulling area covered in the latest design conventional mixer.

Utilizing the modern principle of centrifugal force, the lightweight horizontal mulling wheels of the 80A apply a pressure of 32.7 p.s.i. to the sand as it is mulled in suspension between rubber-tired wheels and rubber-lined bowl.

In the latest conventional mixer, pressure is applied by massive spring-weighted, vertical wheels; the maximum pressure according to the manufacturer is 31.5 p.s.i. Thus, using the same basis of computation, the Speedmullor *provides approximately equal mulling pressure over nearly three times the mulling area every minute.* With the added advantages of non-slip, rubber-to-rubber mulling and a much faster sand discharge, more than three times the mulling results.

Every Speedmullor model offers the same comparable advantage.





Above: The three mulling wheels of the 80A Speedmullor rotating at 62 RPM cover an area of 210,000 square inches per minute.

Right: Using centrifugal force, each wheel exerts a pressure of 32.7 p.s.i. against the sand.

LOOK TO BEARDSLEY & PIPER FOR BETTER METHODS

MEMBER EMA

DIV. PETTIBONE MULLIKEN CORP.

WRITE TODAY FOR FULL DETAILS

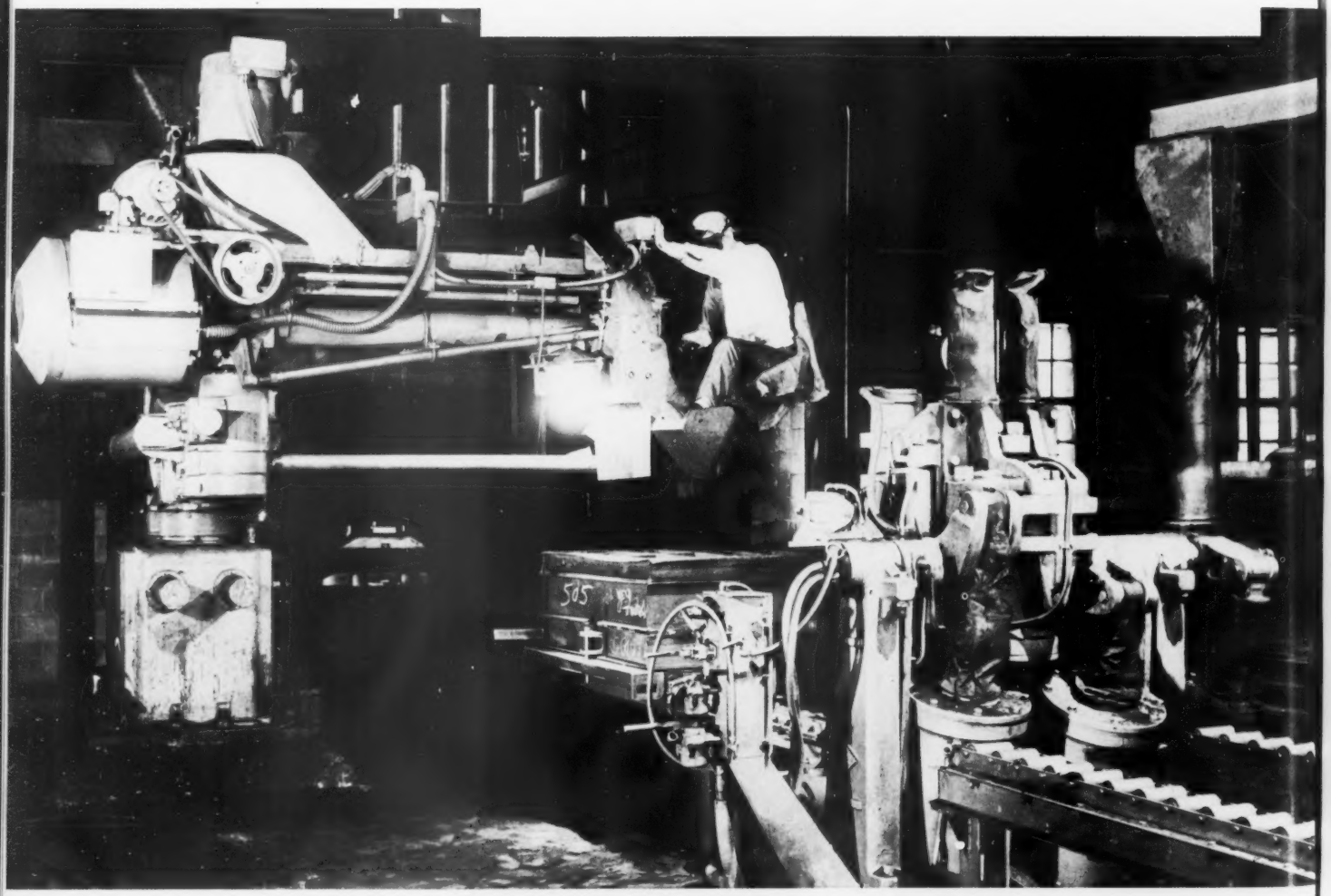
SPEEDMULLOR

6 Models Capacities from 7 to 76 Tons per Hour

2½ Times Capacity with Half the Men!

HOW Brooks Foundry Company INCREASED CAPACITY FROM 40 TO 100 TONS PER DAY WITH B & P SPEEDSLINGER, CHAMPION SPEED-DRAW, AND J & J ROLLOVER

The Brooks Foundry Company of Albion, Michigan, have mechanized their large-mold production with a Stationary Speedslinger, a B&P Champion Speed-Draw machine, and a J&J 1020 RX Rollover Draw machine. Copes are Speedslinger rammed on the Speed-Draw while drags are Speedslinger rammed on the rollover. Each mold contains from six to eight cores and casting weight varies from 800 to 5000 lbs. Before mechanization thirteen molders produced forty tons of castings per day. Now, seven men are able to produce over one hundred tons per day. This production boost is a tribute to the teamwork of these machines. Champion Speed-Draws and J&J RX Series Rollovers are *job-fitted* to slinger molding units.



LOOK TO BEARDSLEY & PIPER FOR BETTER METHODS

FEMA MEMBER FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION

Now, 7 men are able to produce 100 tons of castings per day on this Speedslinger molding unit at Brooks Foundry Company, Albion, Michigan. Before installation of the Speedslinger, the J&J 1020 RX Rollover and a Champion Speed-Draw, 13 men produced 40 tons.

write today for complete information

DIV. PETTIBONE MULLIKEN CORP., 2424 North Cicero Avenue, Chicago 39, Illinois

INDUSTRY BRIEFS

ABRASIVE & Metal Products Co., Detroit, has bought Sterling Abrasives Division of Cleveland Quarries Co., Tiffin, O. The former division has been renamed Sterling Grinding Wheel Co. and will be operated as a wholly-owned subsidiary of the new owner. No change in personnel is contemplated.

* * *

Bendix Aviation Corp., Teterboro, N. J., has changed the name of Eclipse-Pioneer Foundries Division to Bendix Foundries. The division makes aluminum and magnesium castings in sand, die, plaster, shell and permanent molds. It serves industrial customers in the aviation, electronic and marine fields.

* * *

Lewis - Shepard Products Inc., Watertown, Mass., has appointed Robert P. Ronowski its representative in Wisconsin. Sales and service facilities are located at 312 East Wisconsin Ave., Suite 208, Milwaukee.

* * *

Hapman Conveyors Inc., Kalamazoo, Mich., has expanded its conveyor line to include engineering and fabrication of bucket, belt, drag and special conveyors and complete plant conveyor systems from design to installation.

* * *

Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland 12, Calif., has appointed Liberman & Gittlen Metal Co., 322 Front Ave., S.W., Grand Rapids, Mich., a distributor of aluminum ingot. The company's sales force covers the state of Michigan.

* * *

Belgian Electric Sales Corp., 40 East 49th St., New York 17, has changed its name to ACEC Electric Corp. The company's line of motors has been extended to include large horsepower motors as well as single-phase motors.

* * *

Cast Iron Pressure Pipe Institute, formerly located at 1006 Warner Bldg., Washington 4, has moved to 820 Pennslyvania Bldg., 425 13th St., Washington 4.

* * *

Robert P. O'Brien Brass Foundry & Pattern Works Inc., has moved to new facilities at 1117 Douglas Ave., Providence 4, R. I.

* * *

Industrial Crane & Hoist Corp., formerly of 315 North Ada St., Chicago, has occupied new facilities at 1536 South Paulina St., Chicago 8. Installation of new equipment and machinery in the 160,000 sq ft now available has more than doubled manufacturing capacity for an expanded line of cranes.

* * *

American MonoRail Co., 13107 Athens Ave., Cleveland, has purchased Landahl Conveyor Co., Columbus, O. The Columbus plant will be operated as a subsidiary. New officers for Landahl include John L. Pischke, president, and Carl Harris, secretary. J. P. Landahl is general sales manager.

* * *

Henry Disston & Sons Inc., Philadelphia, has opened a new office and warehouse at 403 East Washington Blvd., Los Angeles. A complete line of industrial products for cutting wood and metal will be stocked by the new warehouse which is under the supervision of Harold Spurgeon.

* * *

Norton Co., Worcester, Mass., will add to its electric furnace capacity by building a new plant in Huntsville, Ala. Completion of the $1,250,000 plant is expected by the end of 1955. The new plant will produce fused magnesia, fused zirconia and boron carbide refractory grain.

* * *

Foundry Services Inc. has moved to new and larger quarters at 2000 Bruck St., Columbus 7, O. The company formerly had its headquarters in New York.

* * *

Air Reduction Co., 60 East 42nd St., New York, has opened a new liquid oxygen plant in Riverton, N. J. Capacity is 110 tons of liquid oxygen a day. The Riverton plant converts substantial portions of oxygen, nitrogen and argon from liquid to gas for sale in the Philadelphia area. Calcium carbide and acetylene gas also are stocked at Riverton.

* * *

Charles Parker Co., 50 Hanover St., Meriden, Conn., has discontinued its gray iron foundry. The facilities freed are being used in the production of nonferrous castings. New equipment and heat-treating machinery has been installed to expand the nonferrous operations.

* * *

Foxboro Co., Foxboro, Mass., has opened a new instrument service and assembly building at 399 Preda St., San Leandro, Calif. The new factory more than doubles the company's West coast manufacturing facilities, providing 8400 sq ft of space.

* * *

Grindle Corp., has expanded its operations at a new location, 15405 Park Ave., Harvey, Ill. The previous location was 16235 Turner Ave., Harvey.

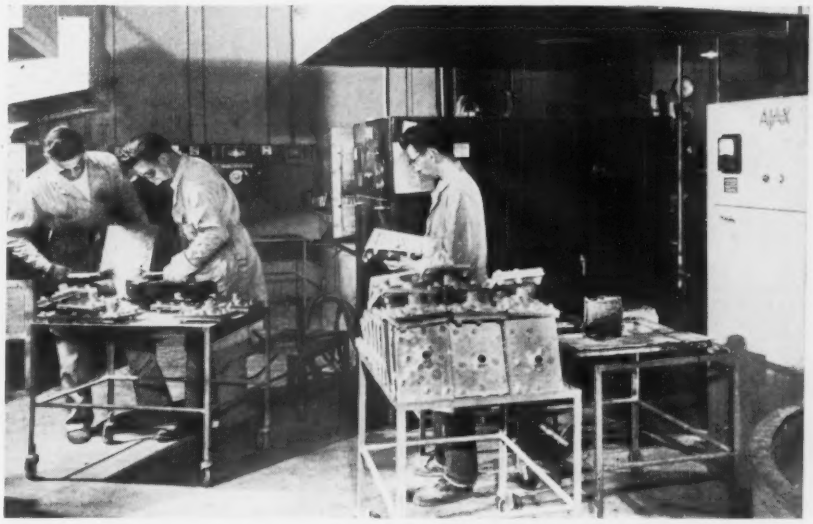
* * *

National Precision Casting Corp., 322 East Berkley St., Clifton Heights, Pa., has appointed Henry Voelker as sales representative in Indiana and Kentucky.

* * *

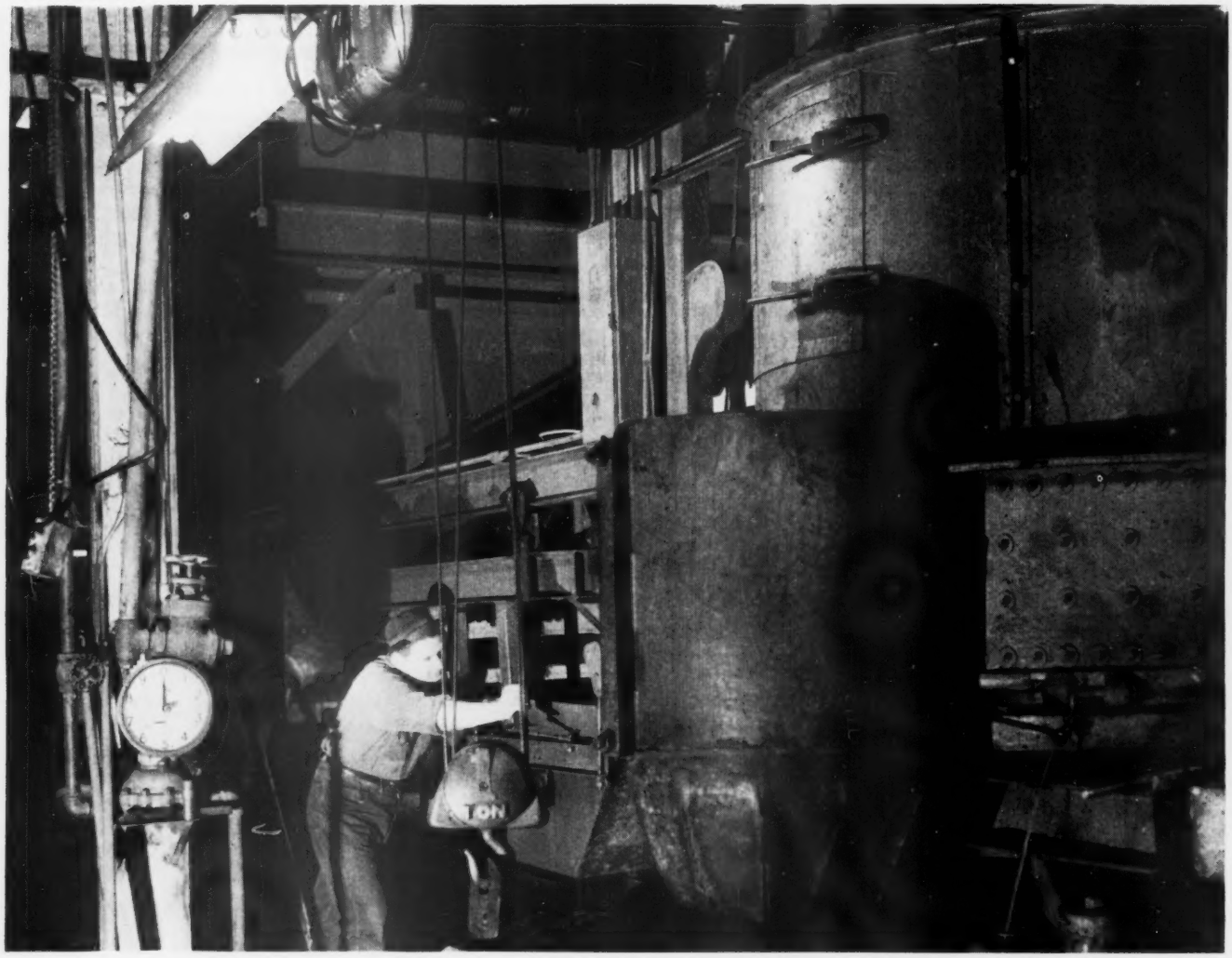
American Blower Corp., Dearborn, Mich., has opened direct factory branch offices at Portland, Oreg., and

(*Concluded on page* 136)



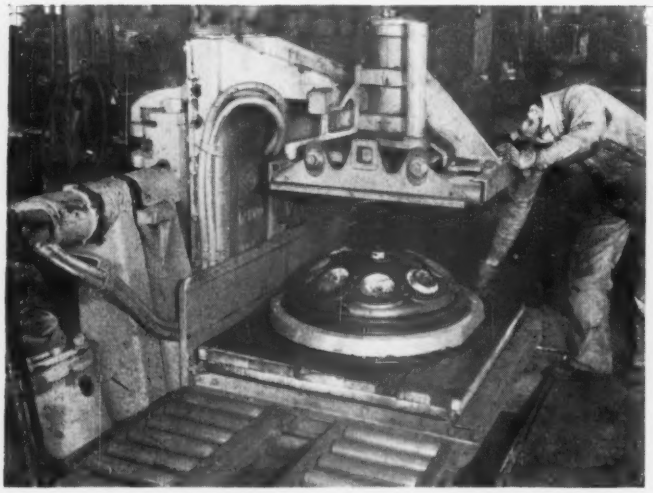
ADDS SHELL MOLDING: Precision Castparts Corp., Portland, Oreg., has added shell molding to its investment casting facilities. The Portland firm specializes in alloy and stainless steel production. Plant facilities include an engineering department and a metallurgical laboratory

(Advertisement)

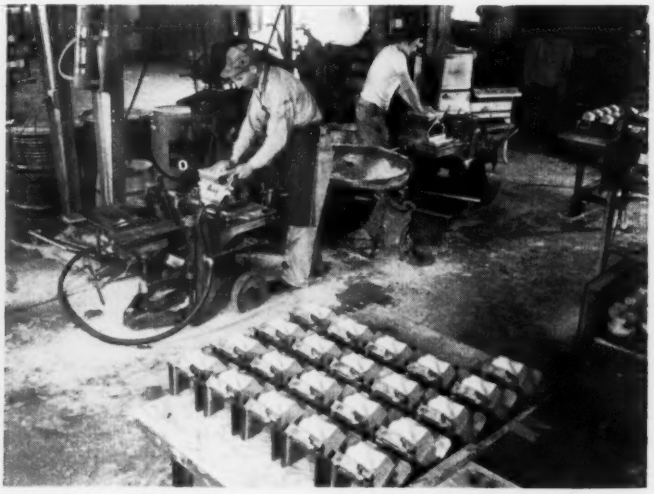


These Foundries Report Profits!

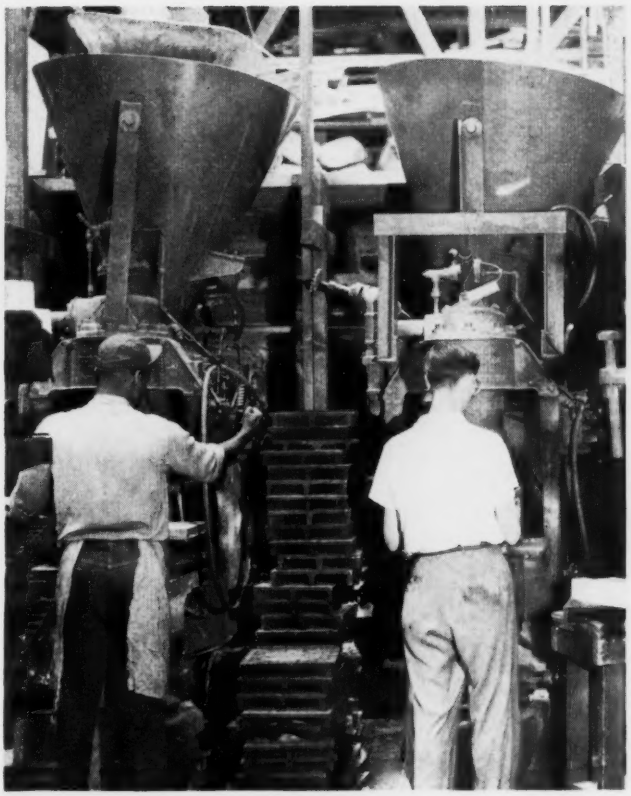
SPEEDMULLORS ON BOTH MOLDING LINES at the I. F. Sales Company foundry at New Philadelphis, Ohio, thoroughly mull all of the all-purpose sand required for 250,000 malleable castings per month. The sand is reused many times a day and enters the "70" Speedmullor (shown above) and the "50" on the other line, very hot. Speedmullor Cooling cools the sand during mulling. *For full information write Beardsley & Piper, 2424 N. Cicero Avenue, Chicago 39, Illinois.*



SPECIALLY DESIGNED FOR SLINGER INSTALLATIONS, this J & J Rol-A-Draw rolls over and precisely draws the molds rammed on a slinger-roller conveyor molding unit at Casting Service Corporation, LaPorte, Indiana. The Rol-A-Draw greatly simplifies the job of mold and pattern handling. *For full data write to Beardsley & Piper, 2424 N. Cicero Ave., Chicago 39, Illinois.*



ON THIS DIFFICULT COREMAKING JOB, CHAMPION JOLT ROLLOVERS are doing a fast precision job. The very deep-finned insert cores for aluminum cylinder heads are produced in large quantities. To fill and draw the deep thin fin sections requires perfect Champion jolting action and a precision Champion draw. *Obtain full data by writing Beardsley & Piper, 2424 N. Cicero Avenue, Chicago 39, Illinois.*

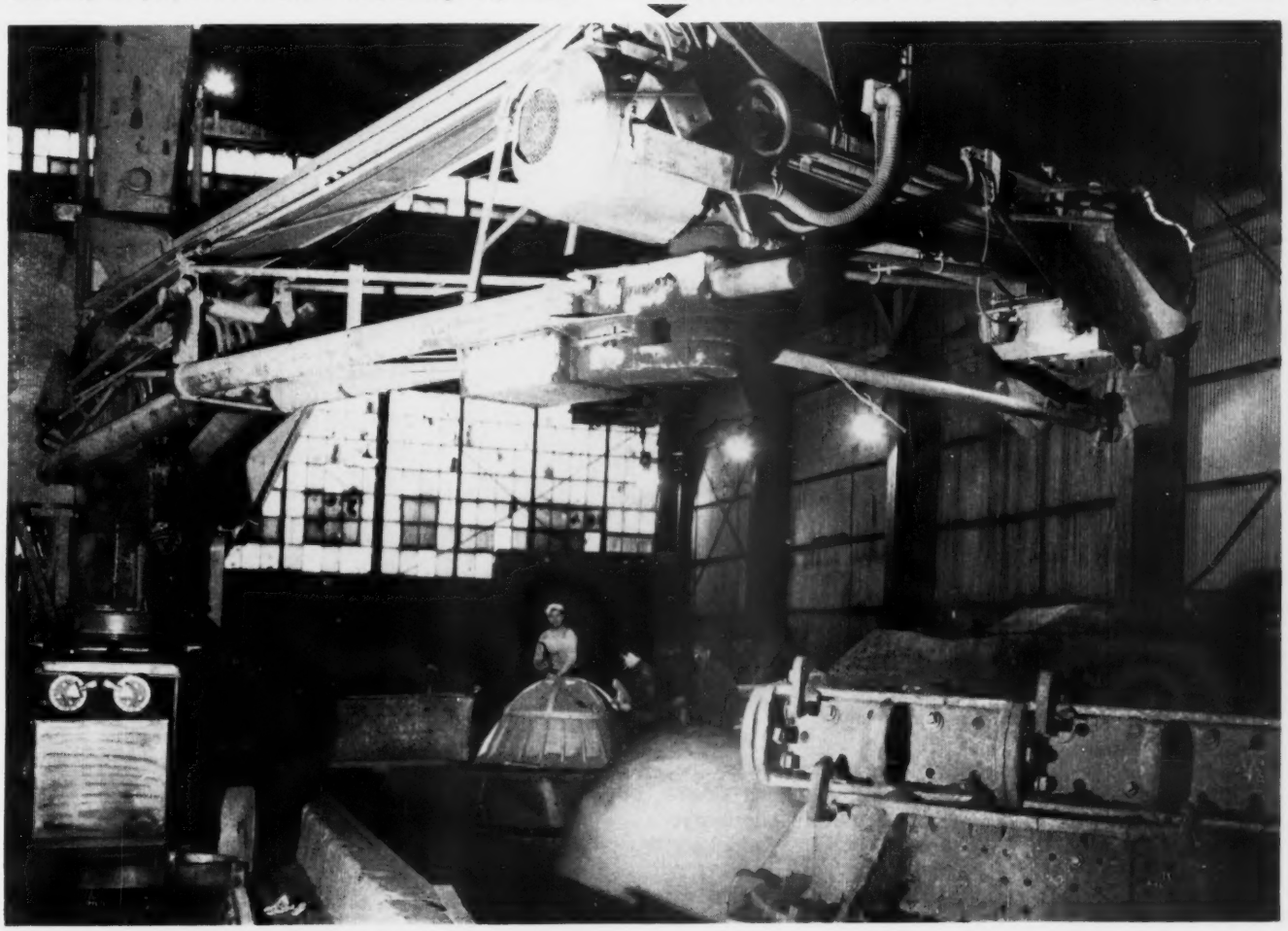


CHAMPION FLEXIBLOS IN THIS MAGNESIUM FOUNDRY mean real savings on small and medium size cores. In producing precision magnesium aircraft castings, the Howard Foundry in Chicago depends on Champion Flexiblo Core Blowers and Speedmullors. *For more data on this interesting operation write now to Beardsley & Piper, 2424 N. Cicero Ave., Chicago 39, Illinois.*

SCREENARATORS AND J&J JOLT SQUEEZERS handle much of the side floor molding at Harsch Bronze in Cleveland. *For more information write to Beardsley & Piper, 2424 N. Cicero Avenue, Chicago 39, Illinois.*

A JR. NITE GANG CUTS COSTS in side floor molding sand preparation at the Kasper Foundry, Elyria, Ohio. *For full information write to Beardsley & Piper, 2424 N. Cicero Avenue, Chicago 39, Illinois.*

PITTSBURGH STEEL'S FOUR SPEEDSLINGERS AND A SANDSLINGER ram a major portion of that foundry's molds. Jobbing work ranging from several pounds to well over 200,000 pounds is produced. Slingers are indispensible in this operation. *For the full story write today to Beardsley & Piper, 2424 N. Cicero Ave., Chicago 39, Illinois.*



(*Concluded from page* 133)

Ft. Wayne, Ind. W. S. Cooper will manage the Portland office; J. W. Johnson will manage the Ft. Wayne office. Both men are mechanical engineering graduates of Purdue University.

* * *

Liebros Casting Co., 330 Fifth Ave., New York, has been incorporated, listing capital stock of 200 shares, no par value. Directors are Edith Marshall, Elliott Cohen and Richard S. Hull, all of 330 Fifth Ave., New York.

* * *

Trombetta Solenoid Corp., 329 North Milwaukee St., Milwaukee 2, has opened its first district office at 612 Garfield Ave., Milford, O. This Cincinnati area office is under the direction of Howard Odoms.

* * *

Wayne Crane Division, American Steel Dredge Co., Ft. Wayne, Ind., has appointed Conrad Hjalmarson its western district sales representative with headquarters in Los Angeles.

* * *

Columbia Industries Inc. has been incorporated as a foundry and machine shop by Gerald T. Ryan, 141 Broadway, Manhattan, N. Y.

* * *

Carborundum Co., Niagara Falls, N. Y., has completed two new warehouses and office buildings in California. One is at 2626 South Malt Ave., Los Angeles, the other at Alviso Rd. and Evelyn Ave., Mountain View, near San Francisco.

Southeastern Conference Program Announced

Program for the 23rd annual Southeastern Regional Foundry Conference, Feb. 17-18 has been announced. The meeting, held last year at Chattanooga, Tenn., returns to Birmingham, with the Tutwiler Hotel there as headquarters.

Host for the conference is the Birmingham District Chapter of the AFS. Tennessee Chapter and University of Alabama Student Chapter are co-sponsors.

Nine technical papers are scheduled to be presented during the two days. One morning will be devoted to plant visitations.

Also on the program are the annual banquet Friday evening and a luncheon Thursday noon. Birmingham Chapter chairman Edwin E. Pollard, Alabama Pipe Co., will preside at the former and vice chairman Albert J. Fruchtl, U. S. Pipe & Foundry Co., will preside at the luncheon.

Program details follow:

Thursday, Feb. 17

9 a.m.—**Registration**

10 a.m.—**"New Molding Practices and Flask Design,"** by William G. Reichert, president, Automatic Foundry Equipment, Reichert Inc., Newark, N. J.

11 a.m.—**"Foundry Costs and Their Meaning to Foundry Supervision,"** by Wally George, George & Dix, Management Consultants, Grand Rapids, Mich.

12:30 p.m.—**Luncheon**

2:15 p.m.—**"Nondestructive Testing as a Tool for Quality Control,"** by John Anspach, Meehanite Metal Corp., New Rochelle, N. Y.

3:15 p.m.—**"Safety, Hygiene and Air Pollution,"** by H. E. Gravlin, Claude B. Schneible Co. Detroit, and W. N. Davis, American Foundrymen's Society, Chicago.

4:15 p.m.—**"Shell Molding,"** by Palmer Derby, foundry engineer, Lynchburg Foundry Co., Lynchburg, Va.

Friday, Feb. 18

9 a.m.—**Plant Visitation**

1:30 p.m.—**"Preventive Maintenance,"** by B. Y. Cooper, design engineer, United States Pipe & Foundry Co., Birmingham.

2:30 p.m.—**"Mechanization and Material Handling,"** by Lester B. Knight, president, Lester B. Knight & Associates Inc., Chicago.

3:30 p.m.—**"Ferrous Melting,"** by W. J. Estes, metallurgist, United States Pipe & Foundry Co., Birmingham. **"Nonferrous Melting,"** by Herman Smith, chief metallurgist-resident engineer, American Smelting & Refining Co., New York.

7 p.m.—**Annual Banquet,** Tutwiler Hotel—Speaker, Houston Cole, president, State Teachers College, Jacksonville Ala.

New Data Book Includes Revised Specifications

Important changes and additions are found in the 1954 edition of "RLM Standard Specifications for Industrial Lighting Units," published by the RLM Standards Institute. New lighting data are included on upward component lighting units. These units deliver from 20 to 30 per cent of the light upward and are designed for locations where a reduction in ceiling contrast is desired. Data include coefficient of utilization tables, luminaire distribution data and candlepower distribution curves plotted at normal, parallel and 45°. Copies of the book may be obtained from the RLM Standards Institute, Suite 818, 326 West Madison St., Chicago 6, Ill.

HOW TO DO IT

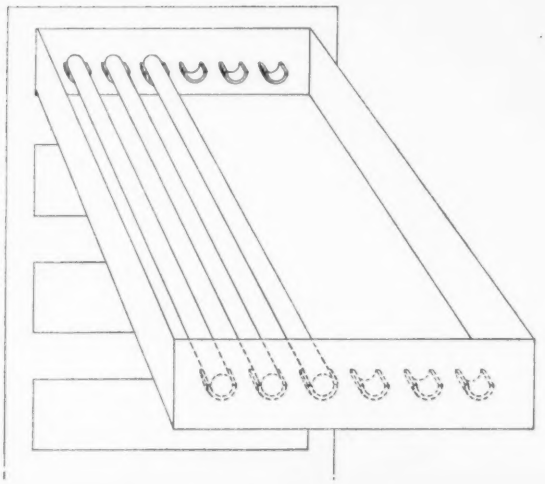
Shelves of Removable Rods Raise Capacity of Core Oven Drawers

By D. W. HARRIS
Tulsa, Okla.

CAPACITY of drawers in a drawer type core baking oven can be increased by welding short pieces of pipe cut in half to the insides of both ends of the oven drawers. The half-round receptacles thus formed accommodate additional rods to make the shelves do double duty on short cores.

If both tall and short cores are to be baked in the same drawer, removal of some of the rods permits the necessary height for the tall cores, while short ones are placed on the drawer bottom and also on the remaining rods. Many variations in placement of the loose rods are possible, and greatly increased oven capacity is attained when many different size cores must be baked at the same time.

Increased oven efficiency may be obtained by using perforated core plates to facilitate circulation of the heated oven air.



Do you have any tricks of the trade tucked away with your foundry experience? Why not release them to fellow foundrymen? FOUNDRY will pay a minimum of $15 for each idea submitted and published. Send a photo or drawing with your idea

Cuts costs
SIMONDS ABRASIVE CO 16242 2F
SURVEY
DESCRIPTION OF WORK:
Skinning stainless steel slabs
WHEEL:
Simonds DA126-V7-B2—24"x3"x12"
PERFORMANCE:
Removed 747 lbs. of metal at rate of 55.6 lbs. per hour. Grinding Wheel cost per lb. of metal removed—$.0740. Compared with competitive wheels used, this wheel
GAVE LOWEST COST.
SIMONDS ABRASIVE CO.
C16 P7 B1
MOS 1315 RPM
TESTED

SNAGGING WHEELS

Are *you* getting the lowest-cost production from your grinding wheels? Let a Simonds engineer help you find out. Whether you use floorstand, swing frame or portable grinders, he can recommend the Simonds Wheels to give you fast, economical production.

Send for catalog bulletin "Abrasive Snagging Wheels" form ESA-62

SIMONDS ABRASIVE COMPANY • PHILADELPHIA 37, PA.

Branch Warehouses: Boston, Detroit, Chicago, Portland, San Francisco • Distributors in Principal Cities

Division of Simonds Saw and Steel Co., Fitchburg, Mass. • Other Simonds Companies: Simonds Steel Mills, Lockport, N.Y., Simonds Canada Saw Co., Ltd., Montreal, Quebec and Simonds Canada Abrasive Co., Ltd., Arvida, Quebec

FOUNDRY DEVELOPMENTS

By EDWIN BREMER

Metallurgical Editor

PROBLEM of segregating foundry returns of different composition has been solved in a comparatively simple manner at National Alloy Division, Blaw-Knox Co., Pittsburgh, according to Martin N. Ornitz, works manager. Solution is use of color coding; because of the large number of alloy compositions involved, a combination of two colors is employed. Each day the men in the burning department, where the gating systems are torch-cut from the castings, are supplied with the chemical analyses of all heats as related to the castings. Those data and a supply of the necessary paints enable the burners to color-code the risers and sprues as they are removed from the castings.

* * *

INVESTIGATION by Nobutaro Kayama on "Effect of Oxides on the Structure of Gray Cast Iron" led to the conclusion that the various oxides such as silica, alumina, magnesia, titania, chromic oxide, etc., when suspended in gray iron tend to prevent the crystallization of graphite. As described in *Report of the Castings Research Laboratory,* Waseda University, Tokyo, the author melted gray iron borings in contact with the oxides under an argon atmosphere. Structures of the resulting irons were examined microscopically, and with the addition of increasing amount of oxides the structure changed from flake graphite to eutectic graphite to ledeburite.

* * *

BRITISH firm has introduced formed graphite liners for pouring ladles which are claimed to have excellent service life. Liner in a 25-lb ladle used for iron gave 3250 pours, and in 195-lb ladles averaged 1500 pours. In casting copper-base alloys 245-lb ladles gave from 1000 to 1500 pours.

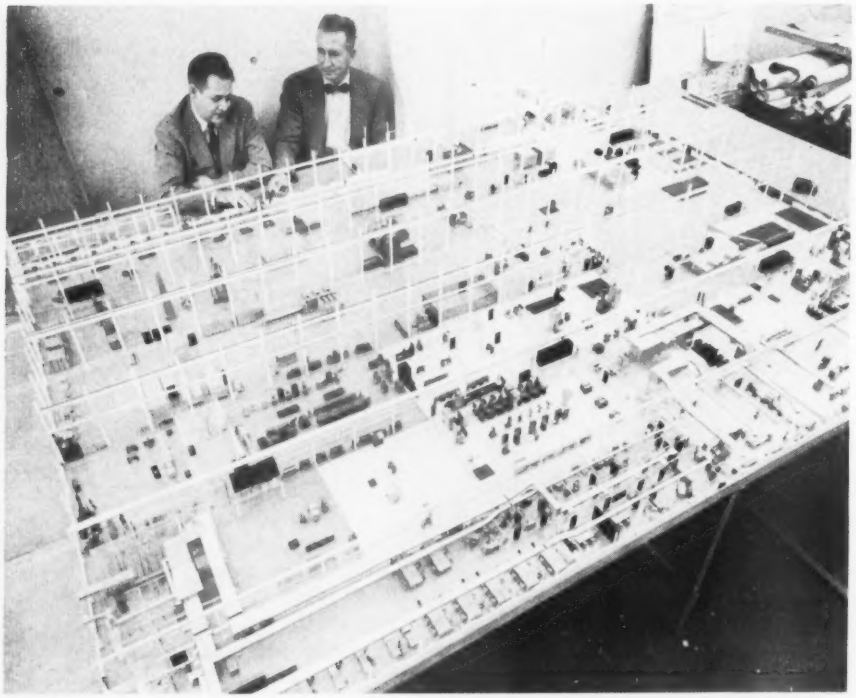
* * *

INTERESTING report now available from Office of Technical Services, U. S. Department of Commerce, Washington 25, is entitled *Research on Shell Molding.* Containing 54 pages with tables, charts, drawing and micrographs, it was prepared by Massachusetts Institute of Technology for the U. S. Army Ordnance Corps, and describes the results of an investigation directed toward lowering costs of the shell-molding process.

* * *

EXPANDING application of vacuum processing to the metalworking field is shown in news releases from two companies engaged in manufacturing vacuum equipment. One mentions the use of such equipment for annealing or heat treating titanium to remove hydrogen and other gases. Parts treated are more ductile, have greater fatigue resistance and longer life. The other release describes briefly a surface conditioning treatment for ingots in which an electric arc plays on a rotating ingot so that the entire surface is melted progressively in a helical path. Operation is carried out in a water-cooled furnace chamber under a vacuum or inert gas, and is automatic.

Pouring cast steel turrets for Army medium tanks at the Union Steel Castings Division, Blaw-Knox Co., Pittsburgh. Firm also will manufacture gun shields



Scale model of interior of the new Westinghouse Electric Corp. metals plant now being constructed at Blairsville, Pa. The 480-ft building is designed for the development and pilot production of new alloys and special castings by any of the several commercial molding techniques

SALVAGING platinum and platinum-rhodium wire used in immersion-type thermocouples used in Timken Roller Bearing Co. melt shop in Canton, O., has saved $5000 in a year. Material salvaged is the short lengths of the wires left in the instruments after a given number of immersions in molten steel. These are 7 to 8 in. long, and are too short for use. However, by welding together six or seven similar pieces, wires of sufficient length for a fresh thermo-assembly are provided.

ACCORDING to Carboloy Department, General Electric Co., Detroit, vacuum-melted metals and alloys pay off in big dividends. Advantages include better yield, workability, increased ductility of the end product, and improved fatigue strength. In addition, compositional limits can be controlled more accurately to permit close specification requirements. Vacuum melting also permits production of certain alloys which, due to their highly reactive nature when molten, cannot be melted in contact with the atmosphere.

Auto-ma-tion

(SELF-ACTING) (PROCESS)

According to WEBSTER

This Logan Vertical Reciprocating Conveyor lowers empty tote pans automatically from overhead Roller Conveyor feed line. Pans are returned from shipping department to chipping and grinding room. Part of complete system of Logan Conveyors in midwestern malleable foundry.

The push-button plant may be nearer than we think! Already, Logan has installed literally miles of conveyor where the flow of material is guided by remote control. And automatic feed to various processes from conveyor — and back to conveyor again — is no novelty in Logan engineered installations.

As this modern conception of plant operation grows and expands, one thing is sure — Logan engineering will be found in the vanguard of the movement. Every conveyor job is, in reality, a step toward automation.

What are your material handling needs? Write today for literature or for the nearest Logan engineer to call.

LOGAN CO., 580 CABEL ST., LOUISVILLE 6, KY.

Logan Conveyors

What a Casting Costs

(*Continued from page* 86)

and gathers general overhead expenses into a special group of accounts for distribution departmentally.

Manufacturers generally fall into four groups based on the degree of detailed cost accumulation:

1. Those who make no attempt at cost accounting. They try to estimate cost as a basis for competitive sales quotations, but these estimates cannot be checked against actual performance because of the lack of adequate records.

2. Those who maintain records of departmental expenses and who can, therefore, periodically check their estimates against actual departmental rates.

3. Those who also attempt to accumulate actual costs by individual jobs but who do not have the necessary controls to prove their costs in total.

4. Those who have a complete and accurate job order cost system.

We are concerned primarily with the procedure of the second group. It is the simplest means of arriving at approximate cost figures. Through use of the cost records and the chart of cost accounts described above, costs can be determined for each type of metal per pound taking into consideration metal loss and shrinkage, defective castings, freight in, and other items of metal burden. Also it is possible to find conversion cost per pound for melting, conversion cost per direct labor hour for molding, coremaking and cleaning, plus a rate per pound for shipping. To get these rates, expenses which cannot be charged immediately to a producing department must be apportioned on an equitable basis.

To meet the needs of both small and large foundries, the society offers alternative procedures in its manual: One provides a simplified cost system and the other an expanded cost system. The chart of cost accounts provides fewer accounts for the simplified system than for the expanded system. Under the simplified system the entire general overhead is distributed on the basis of the proportionate share of combined direct and indirect labor in each producing department.

How To Expand the Cost System—Cleaning and shipping should be accounted for as separate departments in foundries with ten or more men. The chart of cost accounts for larger foundries also gives a greater breakdown of labor, supplies and expense in each producing department. In addition, expenses other than departmental burden are divided between fixed overhead, variable overhead, selling expense and administrative expense. Other refinements are illustrated in detail in the cost manual.

The chart of cost accounts for the expanded cost system groups overhead accounts according to the following bases on which they are to be distributed to the direct foundry departments:

1. Combined direct and indirect labor,
2. Total horsepower hours,
3. Floor space, and
4. Equipment valuation.

Overhead expenses must be apportioned on the basis indicated above before the conversion rate can be determined for each process. Groups 1 and 2 constitute variable overhead which will increase with the pounds of castings produced. The remaining two groups are considered fixed overhead and will not fluctuate with production. This distinction is important, particularly in connection with budgeting foundry expenses.

Costing and Quoting—Section V of the manual deals with six topics applicable to foundry procedure regardless of the size of operation. The first covers budgeting of foundry operations. Usually the budget can be fairly definite for an advance period of from three to six months, and can be determined tentatively for a year in advance. In the foundry industry normal capacity approximates 80 per cent of maximum productive capacity and standard capacity is frequently established as 75 per cent of normal capacity. From the budget, seperate hourly rates should be predetermined for fixed overhead and variable overhead.

The cost of replacing defective castings can be absorbed by dividing the total cost by the number of good pieces produced. An alternative would be to add to the estimated cost a percentage calculated to cover the replacement cost of scrap.

The third topic in this section expands upon certain prime factors to be considered in estimating production for quotations.

"Cost Department said it was cheaper to mount the conveyors on springs and shake the building!"

Metal loss or shrinkage can be determined through the use of two equations, the information for which can be obtained from the accounting records. These equations follow:

Metal consumed equals the initial inventory of metal, plus purchases, plus in freight and other expenses, and minus the final inventory of metal.

Good castings produced equals castings in process at the end of the period, plus castings sold, minus castings in process at the beginning of the period.

Excess weight of metal consumed over the weight of castings produced represents the loss or shrinkage in metal. This frequently runs as high as 5 per cent of the weight of good castings produced. The percentage also will vary with different types of metal and with different types of castings. Those foundries that use the chart of cost accounts recommended by the cost committee can determine the proper percentage of metal loss or shrinkage directly from the ledger.

Basis for Pricing Inventories

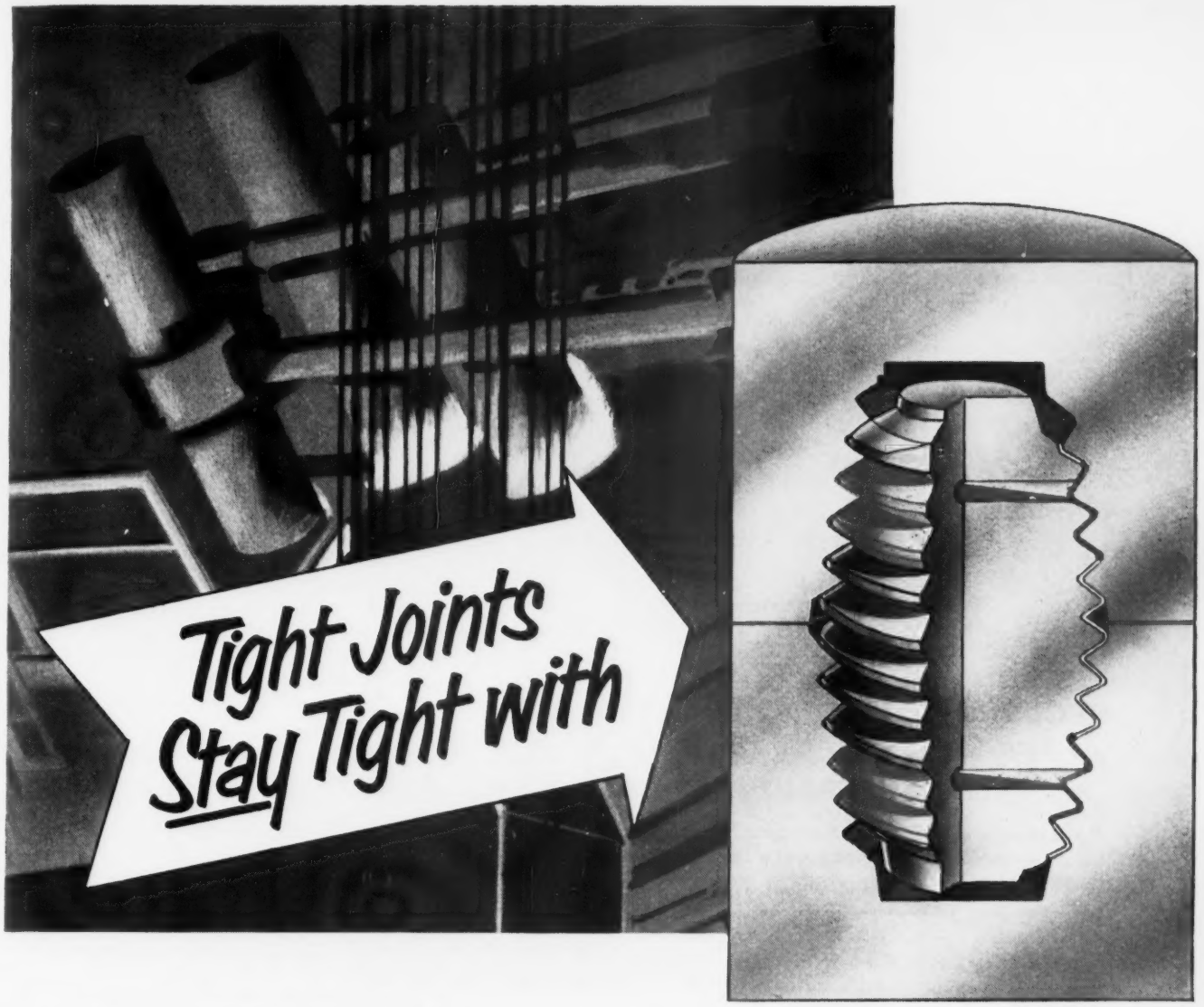
Metal cost will depend upon the basis used for valuing the monthly metal inventory regardless of whether these are physical inventories or are based upon book records. Some nonferrous foundries use the lower of cost or market price as a basis for pricing these inventories. In that case, of course, the inventory always will be valued at prevailing market prices when those are less than cost. Cost may be interpreted on either of two commonly used bases: FIFO, that is, first-in first-out, or average cost. Under the first method, the metal purchased first is presumed to be used first, while under the second method, all purchases are presumed to be used proportionately to the quantities involved.

Correct metal costs are obtained by including inbound transportation charges and any items of metal burden, such as labor, laboratory expenses and other expenses incidental to the receiving and handling of metal. The sales of scrap also must be credited to a separate account for each type of alloy.

The last two articles in the manual cover recomputation for future costing and terms and conditions of sale of the nonferrous foundry industry.

The methods outlined permit management to determine the proper cost per pound for metal to be used in any particular job. By weighing the pattern or by computation, the pounds required can be determined. The cost per pound for melting can be added

(*Concluded on page* 142)



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(*Concluded from page* 140)

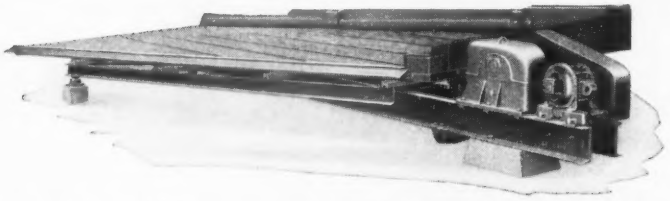
to this figure. In the absence of detailed job tickets for the various workers in the factory, exact costs for molding, coremaking and cleaning can not be obtained. However, the direct labor hours required can be estimated and multiplied by the conversion rate per hour that the books indicate. In this manner a much more accurate determination of the cost of each job can be obtained than would be possible if such records are not kept.

To the production cost thus obtained, an appropriate margin should be added for selling and administrative expenses and for profit, to determine the selling price. It should be remembered that any average cost is dangerous and that accurate costs can be obtained only for individual jobs. Once these individual job costs have been calculated, sales policy may, of course, require that certain types of castings be averaged for a particular customer.

The procedure outlined above permits any nonferrous foundry to approximate costs more nearly for individual jobs than would be possible if no such records were kept. This is a great advance and may lead to development of a complete and more accurate cost system.

The preceding covers in a very general way the cost principles expounded in the latest edition of the NFS cost manual. The manual now is available from society headquarters, 192 North Clark St., Chicago. The society also advises its members to avail themselves of the services of professional accountants in installing or revising their cost systems.

Editor's Note: Charts shown in this article have been reproduced from the cost manual of the Non-Ferrous Founder's Society with its permission.



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Many cost minded manufacturers are profitably capturing and recapturing these important values.

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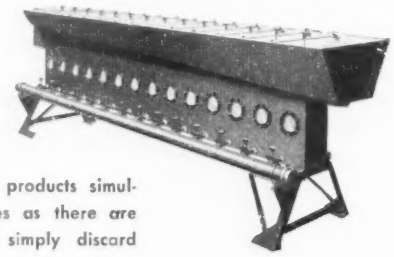

For fast, efficient reconditioning of used foundry sands, the CONCENCO Hydraulic Classifier cleans by separating up to ten or more accurately sized spigot products simultaneously . . . as many sizes as there are cells in the classifier. You simply discard the waste products. Continuous operation—no moving parts.

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GIFS Publishes Manual On Heat Treatment

Complete coverage of the heat treatment of gray iron is given in a new manual recently published by the Gray Iron Founders' Society Inc., National City-East Sixth Bldg., Cleveland 14. It includes an authoritative description in nontechnical language of all methods of heat treating gray iron, including stress relieving, annealing, flame hardening, induction hardening and tempering. The author, the late C. O. Burgess, has included many pictures, graphs and tables to illustrate the manual. A complete bibliography and two appendixes add to the value of the over 100 pages of text.

Committee members of the society responsible for the development of the manual are: H. P. Good, Textile Machine Works, Reading, Pa.; J. S. Vanick, International Nickel Co., New York; J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham; A. E. Schuh, U. S. Pipe & Foundry Co., Birmingham; T. I. Curtin, Waltham Foundry Co., Waltham, Mass. The manual is available from GIFS for $5. Price to society members, public libraries and schools is $2.50.

Small Business Wage Incentives Described

Objectives of wage incentives, methods of wage payment, factors in the design of a wage incentive plan and some precautions are given in a bulletin of the Small Business Administration. The bulletin, "Wage Incentives in Small Business," is No. 57 in a series of management aids for small business. It is available from field offices of either the Small Business Administration or the U. S. Department of Commerce, or upon request to the Small Business Administration, Washington 25.

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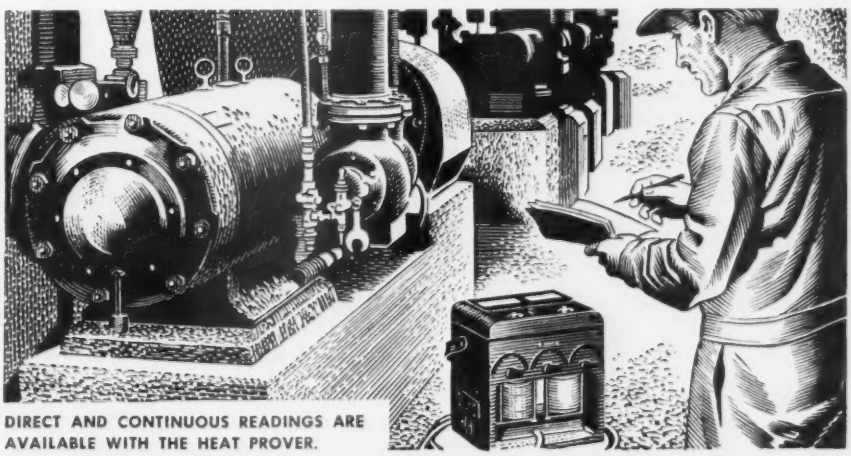
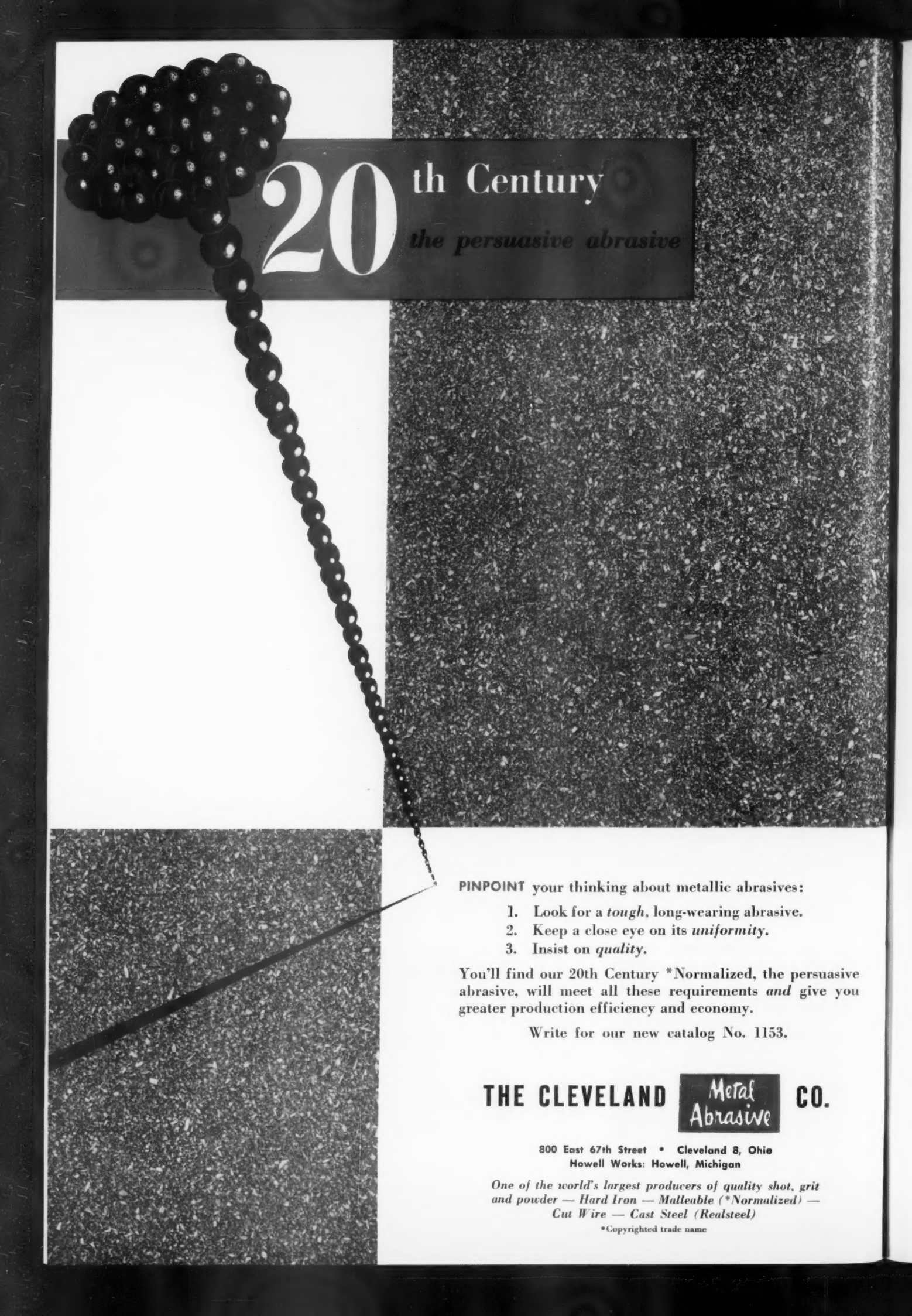


DIRECT AND CONTINUOUS READINGS ARE AVAILABLE WITH THE HEAT PROVER.



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2. Keep a close eye on its *uniformity*.
3. Insist on *quality*.

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*One of the world's largest producers of quality shot, grit and powder — Hard Iron — Malleable (*Normalized) — Cut Wire — Cast Steel (Realsteel)*

*Copyrighted trade name

FOUNDRY STATISTICS

MALLEABLE IRON

(Shipments of castings—net tons[1])

	Shipments		Unfilled Orders[2]
	Total	For Sale	
1952	926,120	573,472	.....
1953			
Sept.	74,593	45,540	114,523
9 mo.	760,717	455,978	.....
Oct.	73,727	45,589	104,046
Nov.	63,663	37,561	93,156
Dec.	72,399	39,721	95,612
Total	970,506	578,749	.....
1954			
Jan.	70,288	38,266	85,565
Feb.	69,078	37,792	81,579
Mar.	84,342	47,126	74,319
Apr.	74,515	39,102	69,094
May	67,856	37,306	67,040
June	72,820	41,121	60,163
July	50,893	25,343	62,711
Aug.	59,259	34,528	62,494
Sept.	58,015	33,929	66,742
Total	597,066	334,412	.....

ALUMINUM

(Shipments of castings—1000 pounds)

	Shipments				Unfilled Orders[3]
	Total	Sand	Perm. Mold	Die	
1952	518,979	194,616	146,883	169,732	.....
1953					
Sept.	53,306	17,826	17,189	17,875	120,838
9 mo.	500,340	165,948	150,692	180,808	.....
Oct.	55,097	17,171	17,030	20,547	115,189
Nov.	51,014	16,169	15,396	19,012	106,977
Dec.	51,571	15,265	16,907	18,963	105,980
Total	658,022	214,553	200,026	239,330	.....
1954					
Jan.	51,446	14,698	16,615	19,709	103,218
Feb.	51,213	14,696	17,281	18,754	96,011
Mar.	56,154	14,468	19,576	21,645	98,407
Apr.	53,006	14,073	18,091	20,266	91,868
May	47,663	12,461	16,312	18,368	83,948
June	48,061	12,442	17,105	17,886	79,126
July	39,636	11,299	13,749	14,004	76,518
Aug.	42,429	11,252	15,335	15,213	76,684
Sept.	46,249	10,717	16,641	18,228	79,873
9 mo.	435,887	116,106	150,705	164,173	.....

COPPER-BASE ALLOY

(Shipments of castings—1000 pounds[2])

	Shipments			Unfilled Orders[3]
	Total	Sand	Perm. Mold	
1952	1,009,910	910,862	63,865	.....
1953				
Sept.	79,595	71,184	5,273	57,209
9 mo.	754,140	678,718	45,382	.....
Oct.	83,899	74,460	5,775	51,723
Nov.	74,782	66,370	5,077	48,842
Dec.	77,675	68,821	5,082	48,421
Total	990,496	888,369	61,316	.....
1954				
Jan.	71,437	63,034	4,618	42,351
Feb.	68,849	60,913	4,743	21,943
Mar.	76,480	67,952	5,123	38,417
Apr.	72,900	65,418	4,732	34,111
May	67,859	61,469	3,755	31,568
June	70,777	64,328	3,567	30,743
July	56,380	51,070	3,073	30,872
Aug.	68,891	63,389	3,547	28,883
Sept.	68,267	62,152	3,637	31,087
9 mo.	621,840	559,725	36,840	.....

MAGNESIUM

(Shipments of castings—1000 pounds[2])

	Shipments		Unfilled Orders[3]
	Total	For Sale	
1952	34,557	32,977	.....
1953			
Sept.	2,455	2,238	12,523
9 mo.	26,121	23,901	.....
Oct.	3,024	2,717	11,473
Nov.	2,681	2,417	10,612
Dec.	2,691	2,434	9,313
Total	34,517	31,469	.....
1954			
Jan.	2,451	2,149	8,800
Feb.	2,194	1,945	8,315
Mar.	2,407	2,109	7,698
Apr.	2,068	1,857	7,358
May	1,738	1,541	7,522
June	2,024	1,820	8,296
July	1,924	1,712	8,073
Aug.	2,157	1,944	7,795
Sept.	2,059	1,855	7,474
9 mo.	19,032	16,932	.....

PRODUCTION WORKERS

Estimated Number

(Thousands)

	August 1954	July 1954	August 1953
Ferrous	187,200	186,400	214,809
Nonferrous	54,500	56,100	75,200

Average Weekly Earnings

Gray Iron	$73.68	$72.73	$74.70
Malleable Iron	74.69	69.55	75.60
Steel	76.02	75.04	80.40
Nonferrous	79.80	77.79	79.38

Average Weekly Hours

Gray Iron	39.4	39.1	40.6
Malleable Iron	38.9	36.8	40.0
Steel	38.2	37.9	40.4
Nonferrous	39.7	38.7	40.5

Labor Turnover Rate (August)

(Per 100 employees)

	Total Accession	Total Separation	Quit	Layoff
Gray Iron	3.2	3.2	1.1	1.7
Malleable Iron	3.9	4.1	1.6	2.0
Steel	2.5	2.7	0.6	1.7
Nonferrous	4.9	5.6	0.9	4.1

Source: Bureau of Labor Statistics

GRAY IRON CASTINGS—SHIPMENTS

(Net tons[1])

	All Castings		Miscellaneous Castings		Heavy Steel Ingot Molds		Chilled Railroad Car Wheels	Pressure Pipe & Fittings	Soil Pipe & Fittings	Unfilled Orders[3]
	Total	For Sale	Total	For Sale	Total	For Sale	Total	Total[3]	Total[3]	
1952	12,869,464	7,371,700	8,122,274	3,792,567	2,238,309	1,070,252	544,896	1,312,518	651,467	.....
1953										
Sept.	1,110,437	617,973	671,869	293,767	233,342	118,980	37,003	109,002	59,221	1,170,191
9 mo.	10,515,334	5,709,466	6,548,374	2,823,780	2,123,102	1,041,828	363,941	969,492	511,425	.....
Oct.	1,146,728	656,612	672,571	304,245	247,324	125,534	41,858	119,124	65,851	1,075,538
Nov.	1,008,908	569,561	592,145	269,577	229,013	112,234	31,332	102,275	54,143	977,012
Dec.	1,036,932	558,204	636,747	277,852	229,720	109,887	30,011	94,707	45,747	954,885
Total	13,707,902	7,494,842	8,449,837	3,675,454	2,829,159	1,389,483	467,142	1,285,598	677,166	.....
1954										
Jan.	932,298	488,497	607,755	261,164	154,359	60,947	31,316	90,898	47,970	871,918
Feb.	936,364	491,983	607,085	252,591	156,933	70,261	29,240	92,546	50,560	865,344
Mar.	1,046,779	553,358	684,272	282,328	153,366	65,950	34,240	113,016	61,895	842,499
Apr.	995,052	528,027	657,126	263,147	126,083	56,114	29,075	116,420	66,348	826,491
May	943,335	516,475	605,385	247,623	122,839	57,106	27,144	122,514	65,453	775,278
June	986,810	556,047	616,317	261,133	141,712	70,060	30,883	130,503	67,395	803,570
July	821,151	449,621	510,173	209,294	131,180	62,681	22,902	98,810	59,086	828,924
Aug.	934,644	541,904	569,790	250,702	140,165	69,897	29,134	127,255	68,300	829,505
Sept.	921,232	559,337	563,472	277,090	139,769	68,053	25,374	125,786	68,921	860,779
9 mo.	8,517,665	4,685,449	5,421,375	2,305,072	1,266,406	581,069	259,308	1,017,748	555,928	.....

STEEL CASTINGS—SHIPMENTS

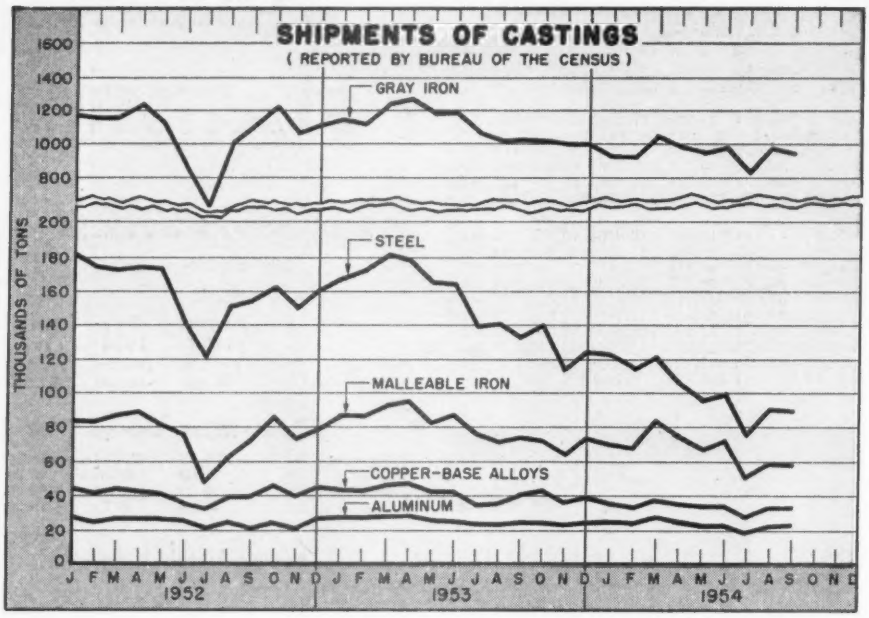
(Net tons[1])

	All Castings			Carbon Steel			Alloy Steel			Unfilled Orders[2]
	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	Total	For Sale[4]	Railway Specialties	
1952	1,927,942	1,476,242	339,561	1,375,233	1,076,285	298,948	552,709	389,816	40,613	.....
1953										
Sept.	135,453	102,986	24,080	95,100	73,382	21,718	40,353	30,338	2,362	327,172
9 mo.	1,455,907	1,115,854	259,259	1,012,108	776,275	236,833	443,799	329,348	22,426	.....
Oct.	140,766	106,813	25,318	99,700	75,260	23,440	41,066	30,780	1,878	313,684
Nov.	114,229	85,047	17,768	79,314	63,086	16,228	34,915	27,108	1,540	308,526
Dec.	123,295	92,299	18,665	85,607	68,617	16,990	37,688	29,912	1,675	278,389
Total	1,834,197	1,400,013	321,010	1,276,729	983,238	293,491	557,468	417,148	27,519	.....
1954										
Jan.	122,758	93,577	20,197	83,927	62,749	18,407	38,831	30,828	1,790	251,847
Feb.	116,520	88,699	17,938	81,433	60,638	15,961	35,087	28,061	1,967	234,634
Mar.	122,310	92,271	15,684	85,211	62,955	14,190	37,099	29,316	1,494	214,367
Apr.	105,788	78,754	11,031	72,118	52,389	9,538	33,670	26,365	1,493	197,857
May	94,610	70,596	9,454	64,546	46,651	8,342	30,064	23,945	1,112	182,502
June	100,022	72,881	8,639	69,021	48,327	7,552	31,001	24,554	1,087	189,594
July	75,848	53,207	5,815	50,453	33,461	4,964	25,125	19,746	851	170,567
Aug.	89,590	66,792	9,844	61,344	44,236	8,148	28,256	21,360	1,196	168,303
Sept.	88,359	64,722	8,668	59,039	41,735	7,690	29,320	22,009	978	158,823
9 mo.	915,805	681,499	106,770	627,092	453,141	94,792	288,453	226,184	11,968	.....

[1]Source: Bureau of Census. [2]For sale only. [3]All cast iron pipe is shipped for sale. [4]Railway specialties not included.

(Concluded on page 146)

FOUNDRY STATISTICS (Concluded from page 145)



COMMERCIAL HEAT TREATING

(National Billings of Metal Treating Institute Members)

	1952		1953		1954	
	No. Reporting	Total Reported	No. Reporting	Total Reported	No. Reporting	Total Reported
June	55	$2,586,113	51	$2,591,154	61	$1,996,770
July	56	2,253,346	58	2,522,651	61	1,722,449
Aug.	57	2,287,135	60	2,452,186	62	1,801,659
Sept.	57	2,498,544	57	2,522,127	64	1,853,665
Oct.	57	2,837,574	59	2,782,219	62	1,916,504
10 mo.		26,122,017		27,020,164		18,261,684
Annual total		30,875,924		31,733,067		.....

ZINC-BASE ALLOY

(Shipments of castings—1000 pounds[1])

	Shipments		Unfilled Orders[2]
	Total	For Sale	
1952	408,353	282,673	.....
1953			
Sept.	38,611	26,049	72,944
9 mo.	404,042	267,136	.....
Oct.	40,382	28,441	73,237
Nov.	37,668	26,097	69,367
Dec.	38,661	27,348	64,105
Total	521,253	349,022	.....
1954			
Feb.	37,660	24,112	55,351
Mar.	42,991	28,828	52,544
Apr.	38,968	25,211	51,388
May	36,793	23,671	46,726
June	40,708	26,890	47,537
July	28,306	18,605	43,231
Aug.	34,639	24,898	46,288
Sept.	36,594	25,617	56,006
9 mo.	337,055	235,089	.....

INDEX OF FOUNDRY EQUIPMENT ORDERS

Foundry Trades Only

(Net Orders Closed, New Equipment)

	1953	1954
Jan.	99.6	173.8
Feb.	97.5	99.9
Mar.	132.2	82.7
Apr.	111.8	125.3
May	182.7	80.8
June	156.8	86.4
July	159.2	68.8
Aug.	236.3	75.6
Sept.	127.7	68.3
Oct.	87.2	....
Nov.	150.0	....
Dec.	161.2	....

Note: Figures are percentages of the base period 1947-49 taken as 100 per cent (monthly average). This is a new base period. Source: Foundry Equipment Manufacturers Association.

COKE PRODUCTION & CONSUMPTION

(Net tons)

	Production	Consumption	
		Total	By Foundries
1952	68,254,109	67,865,639	3,102,446
1953			
Sept.	6,404,143	6,330,441	236,119
9 mo.	59,612,004	59,590,605	2,251,876
Oct.	6,554,638	6,555,613	236,329
Nov.	6,208,155	6,039,813	216,837
Dec.	6,093,009	6,041,383	210,388
Total	78,467,806	78,227,414	2,915,420
1954			
Jan.	5,812,426	5,639,117	224,298
Feb.	4,889,717	4,920,651	211,114
Mar.	5,146,189	5,177,765	228,139
Apr.	4,693,036	4,569,843	212,272
May	4,802,245	4,656,950	204,958
June	4,640,084	4,683,726	194,664
July	4,618,665	4,555,701	170,617
Aug.	4,510,603	4,501,477	195,344
Sept.	4,497,034	4,439,097	191,576
9 mo.	43,609,979	43,144,327	1,832,982

INGOT BRASS & BRONZE

(Shipments in net tons)

	1953	1954
Jan.	24,423	20,661
Feb.	25,429	19,920
Mar.	28,256	23,653
Apr.	25,044	24,746
May	21,660	22,269
June	20,818	22,348
July	19,321	17,074
Aug.	20,156	21,684
Sept.	21,463	22,464
Oct.	22,280	24,080
Nov.	21,860	.....
Dec.	20,541	.....
Total for year	271,251	.....

IRON AND STEEL SCRAP CONSUMPTION

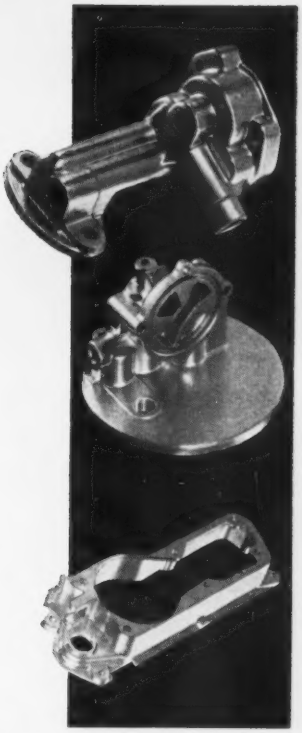
(Gross tons*)

	All Scrap Total	By Types of Furnace		
		Cupola Total	Air Total	Electric Total
1952	61,625,549	9,154,146	1,053,233	8,015,064
1953				
Aug.	5,637,759	753,272	77,047	678,968
8 mo.	48,246,845	6,672,114	641,648	6,130,995
Sept.	5,395,721	782,131	80,866	595,523
Oct.	5,628,568	779,444	75,618	566,878
Nov.	5,064,565	687,498	60,200	477,666
Dec.	4,690,277	755,276	68,002	442,818
Total	69,005,976	9,676,463	1,026,334	8,263,880
1954				
Jan.	4,574,384	711,335	71,202	505,536
Feb.	4,385,340	704,535	67,263	462,095
Mar.	4,637,573	783,529	82,337	517,702
Apr.	4,582,862	748,766	79,183	518,048
May	4,776,603	710,159	67,368	506,582
June	4,664,561	725,910	75,306	515,019
July	3,909,336	565,275	45,920	420,564
Aug.	4,164,703	671,631	65,336	486,596
8 mo.	35,695,362	5,621,140	553,915	3,932,142

PIG IRON PRODUCTION AND CONSUMPTION

	Production** (Standard grades—net tons)					Consumption* (By type of furnace—gross tons)			
	Total	Foundry	Malleable	Basic	Low Phos. Intermediate Low Phos. & Bessemer	Total	Cupola	Air	Electric
1952	61,306,723	2,864,722	3,013,267	48,253,390	7,175,344	61,550,961	5,438,294	449,646	118,820
1953									
Oct.	6,409,245	218,880	290,882	5,175,064	724,479	5,733,466	395,066	21,349	13,206
10 mo.	63,171,063	2,225,977	3,182,818	50,980,240	7,051,096	56,221,041	4,200,409	236,187	135,864
Nov.	5,995,511	201,047	277,181	4,889,252	658,031	5,324,537	343,233	17,528	15,842
Dec.	5,712,937	172,283	276,432	4,625,524	638,698	5,091,786	374,838	18,596	12,561
Total	74,878,511	2,599,307	3,736,431	60,465,016	8,347,817	66,637,364	4,918,480	272,311	164,267
1954									
Jan.	5,531,137	184,629	294,691	4,510,870	540,947	4,933,282	362,576	17,620	14,578
Feb.	4,764,613	156,178	272,707	3,911,670	424,058	4,293,942	351,824	17,257	9,892
Mar.	4,907,147	213,249	243,356	3,977,137	473,405	4,367,814	390,929	21,369	13,112
Apr.	4,449,269	155,249	256,662	3,630,901	406,477	4,021,957	375,045	26,553	10,497
May	4,572,252	154,768	231,479	3,741,671	444,334	4,188,269	367,437	16,453	16,531
June	4,683,629	175,759	200,154	3,853,444	454,272	4,297,531	375,601	18,545	14,196
July	4,590,076	182,130	182,527	3,790,999	434,420	3,990,431	293,926	12,258	13,317
Aug.	4,529,291	186,097	165,891	3,722,094	455,209	4,013,552	354,067	15,926	10,325
Sept.	4,417,888	188,599	179,629	3,622,799	426,861	.....	.....	.....	.....
Oct.	4,937,436	212,237	248,643	3,979,437	497,119	.....	.....	.....	.....
10 mo.	47,382,758	1,808,895	2,275,739	38,741,022	4,555,772	.....	.....	.....	.....

*Source: U. S. Dept. of Interior. Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census. [2]For sale only.



. . . THERE'S MORE TO PRODUCTION DIE CASTING THAN MEETS THE EYE!

Only the LEWIS 650-B die-forge casting machine features injection pressures up to 100,000 pounds and the exclusive new 650-ton "HYDRA-LOCK" clamping mechanism.

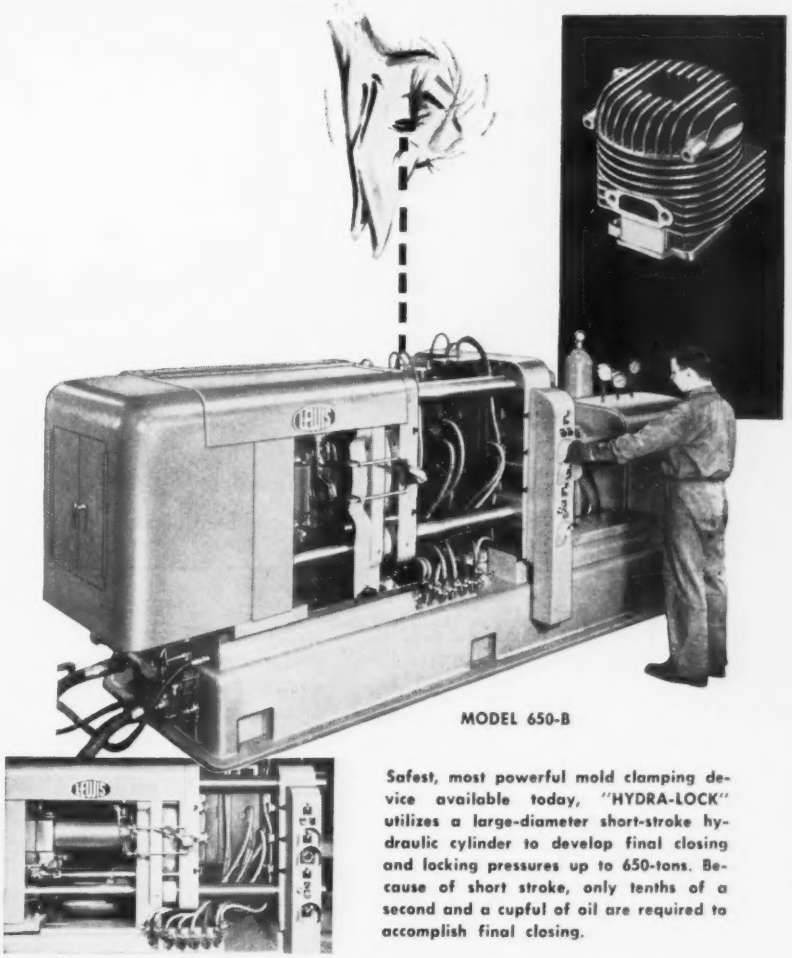
"HYDRA-LOCK" assures maximum safety and prevents "spitting". Its design also provides for faster, easier die setting through a ball-and-socket action that compensates for misalignment of die faces within reasonable limits. Both final squeeze pressures and injection speeds are variable to meet individual job requirements.

Model 650-B is engineered to mass produce, with minimum scrap, high-strength low-cost aluminum and magnesium alloy parts weighing up to 9.5 pounds. Large platens . . . high-speed 2-stage injection . . . fingertip controls . . . and a remote power source for flexibility of installation combine to create a superior die casting unit.

Write for Catalog 103 today

1957-LW

LEWIS



MODEL 650-B

Safest, most powerful mold clamping device available today, "HYDRA-LOCK" utilizes a large-diameter short-stroke hydraulic cylinder to develop final closing and locking pressures up to 650-tons. Because of short stroke, only tenths of a second and a cupful of oil are required to accomplish final closing.

THE LEWIS WELDING AND ENGINEERING CORPORATION
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Exterior of the new AFS headquarters building, in Des Plaines, Ill., near Chicago

AFS Dedicates New Headquarters Building

THE new headquarters building of the American Foundrymen's Society, located at Golf and Wolf Roads, Des Plaines, Ill., was dedicated to foundry progress on Nov. 18. About 200 guests were present for the ceremonies, including present officers and directors, ten past presidents and many members of the Alumni Group. Before and after the dedication, the guests were conducted through the various offices of the headquarters building.

The exercises were in charge of President Frank J. Dost and General Manager William W. Maloney. Short talks were made by Ralph J. Teetor, chairman of the Building Committee, and Frank C. Riecks, Ford Motor Co., who handled the details of the construction project. The mayor of Des Plaines welcomed the society to that city.

The building exterior, the reception room and the combined library and conference room are shown in the accompanying illustrations. The library and conference room is located in the center section with the picture windows. The building provides 11,139 square feet of space, all on one floor. The entire building with the exception of the stockroom, will be air conditioned the year around.

Reception room in the new building is light, airy and comfortable

Combined library and conference room is located in center of building

Shell Molding

(*Continued from page* 79)

best for our purpose. This sand is washed and dried and of about 120 AFS fineness. It has a wide spread of grain size, with about 13 per cent on the pan.

We can get a good strong shell that holds its shape under molten iron temperature and is free from thermal cracks under normal conditions. The castings have a good commercial shell casting finish. We know that more care and experimentation, such as blending two or more sands together, will further improve the surface appearance of our castings, but this step has not yet become necessary. We use a muller which will deliver up to 5000 lb of mixed sand and resin per hour.

Approximately 75 per cent of our castings, both green sand and shell, receive a heat treatment, Fig. 8., because of our customers' requirements, and may include a stress-relief or an anneal.

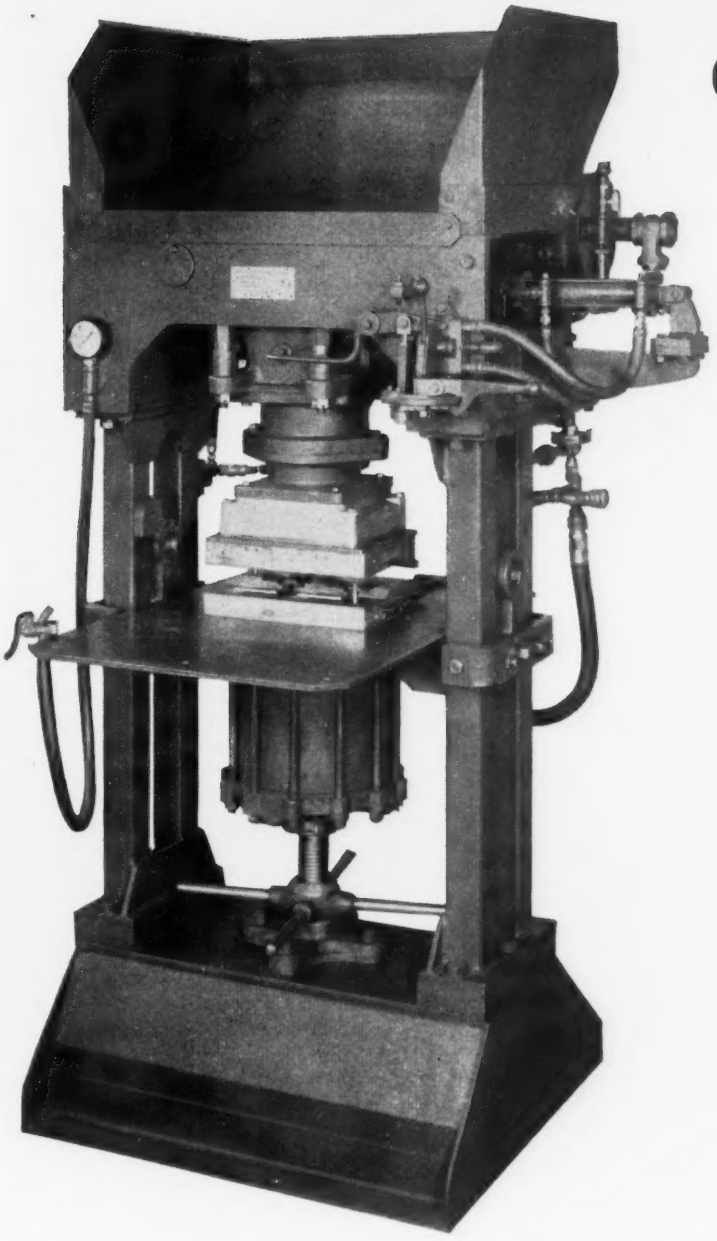
It is necessary to blast clean our green sand castings before heat treatment to remove the heavy sand adhering to the casting surface. These sand castings must be cleaned again before shipment to our customers.

With shell molded castings, the movement is directly from our shakeout or the breakoff station to the heat-treatment building, eliminating handling and cleaning. One of the most consistently stimulating experiences in a shell molding operation is the clean, smooth appearance of the castings at the shakeout station. Where no heat treatment is required, shell castings need much less cleaning than sand castings.

To produce shell castings with the most profit, automation must be used in the foundry layout to the highest degree possible. First, the physical

(*Concluded on page* 150)

Redford No. 4-D DRAW TYPE CORE BLOWER



Designed primarily to fill the need for a fast and flexible draw type machine to handle work from a few ounces to 10 lbs., the Redford #4-D can be quickly adjusted to accommodate core boxes not requiring the draw feature, or can be equipped with a clamp to handle vertically parted core boxes.

Rugged construction, simplicity of change-overs and a fast operating cycle make it suitable for either jobbing or high production work.

Exhaust air is utilized to thoroughly fluff the sand remaining in the sand magazine after each blow, thus reducing the possibility of cratering.

The stationary sand magazine and accurately guided draw table assure perfect drawing of the cores. Vibration of the core box is automatic.

Magazine heads normally furnished with the #2 Redford machine can be used with the #4-D Redford. Larger new type magazine heads especially suited for draw type work are also available as standard equipment.

Valves are designed to assure maximum safety. The operator must use both hands at the same time in order to clamp the core box.

The Redford #4-D has been thoroughly proven in both small and large foundries. To get complete information write for Bulletin 4-D.

Redford IRON & EQUIPMENT CO.

20733 GLENDALE AVENUE • Phone KEnwood 1-8611 • DETROIT 23, MICHIGAN

(*Concluded from page* 148)

arrangement of the sand storage and the sand-resin mixing equipment should be such as to require the least amount of effort and attention on the part of the sand mixer to get the mixed material to the shell molding machine. One operator spends about half his time to mix the volume of sand and resin necessary to keep four automatic machines operating at maximum production. We believe that automatic sand feed, Fig. 7, to the shell mold machines is desirable to eliminate human attention and also to maintain a constant level in the investment chamber.

We are convinced that a vertical drop of sand-resin mix on the surface of a heated pattern plate is the surest way to obtain dense shell molds on any type of pattern contour. One operator can handle easily both the automatic shell molding machine and the shell bonding fixture and still have ample time to set cores and deliver the bonded molds to the pouring station or to a shell storage rack. We have jobs requiring the setting of as many as 24 cores per mold.

Pour Horizontally

Shell mold pouring should be so arranged that the least amount of effort is required to set up and pour. Our pouring monorail is on a spur at right angles to our main pouring line, only about 30 ft from the mixing ladle. We use steel trays, holding an inch or two of gravel as a base for the shell mold, to transport horizontally poured molds around on a roller conveyor.

A much neglected phase of shell molding has been the use of shell cores—that is, hollow cores made with a phenolic resin and sand mix. We are starting to use shell cores, Fig. 9, in our green sand operation as well as in the shell foundry. In one instance, we found that shell cores cost only one-third as much as blown cores had cost. In addition, we obtained on the inside of the casting the smooth, glossy surface characteristic of the shell process.

The strength of a shell core with a wall only $\frac{1}{8}$-in. thick is surprising. The core is under compression from the molten metal around it and holds up long enough for the surface of the casting to become solid. The gas passes freely from the core, and at shakeout the burnt-out sand falls freely from the casting.

Our accountant recently made an exhaustive check into the comparative costs of both mechanized sand and mechanized shell molding operations. A few very interesting figures came to light. The average total labor cost of producing and shipping a pound of green sand castings, for example, was 3.16 cents more than the total labor cost of producing and shipping a pound of shell molded castings. Although it is true that there still is a larger percentage of cored work in our green sand foundry, we are not shying away from cored jobs in shell.

By way of explanation, we are a squeezer shop, and our average casting weight probably is around 3 lb. We pour only gray iron of various types, ranging from about 28,000 to 45,000 lb tensile. Another interesting figure which came out of this check was that the total material cost of the molds including sand, resin, etc., was 1.2 cents per pound of shell molded castings shipped.

One of the most common objections to the use of shell molded castings is pattern cost. Actually, there is very little difference in this pattern cost if one compares a production green sand pattern—made of brass or cast iron and mounted on cast iron plates—with a shell pattern. In this instance, most of the cost differential is caused by the close tolerances required on the shell pattern, where finish allowances may be eliminated or reduced.

When an aluminum matchplate is compared with a production shell pattern, however, there is a marked differential in cost in favor of the former. This spread varies widely, depending upon the pattern shape, Fig. 10, and the extent to which it may be finished in straight-forward machining operations, such as turning or milling. We use standard accessories, such as pattern plates, ejector pins, pin bushings and springs, locator buttons, etc. These standard accessories save time and money in shell patternmaking. Various techniques are being used to reduce the metal pattern bench finishing time. Therein lies most of the cost of many patterns.

Aluminum has proved to be a pattern material which is limited in its application to shell molding. We feel that it is best to avoid aluminum on jobs which run quite steadily. Perhaps some practical means will be developed to eliminate or coat the pinhole porosity common in aluminum patterns. On vertical surfaces this condition is prone to scratch and tear, leaving lines on the pattern surface. Some of our aluminum shell patterns have cut back 1/32-in. or more because of this porosity. A hard coating on aluminum patterns would be desirable if it would stand repeated heating and cooling without peeling or softening.

Care must be taken whenever possible, to use patterns and pattern plates of similar material. With normal operating temperatures above 450°F, unequal expansion of pattern and plate can cause some peculiar conditions. We know of one instance when shell castings consistently showed a shift on the parting line, although the cope and drag patterns showed a perfect match when checked cold on the surface plate. The heavy steel dowels near each end were holding the brass pattern to the plate, and the center was shifted as the brass expanded more than the cast iron plate upon which it was mounted.

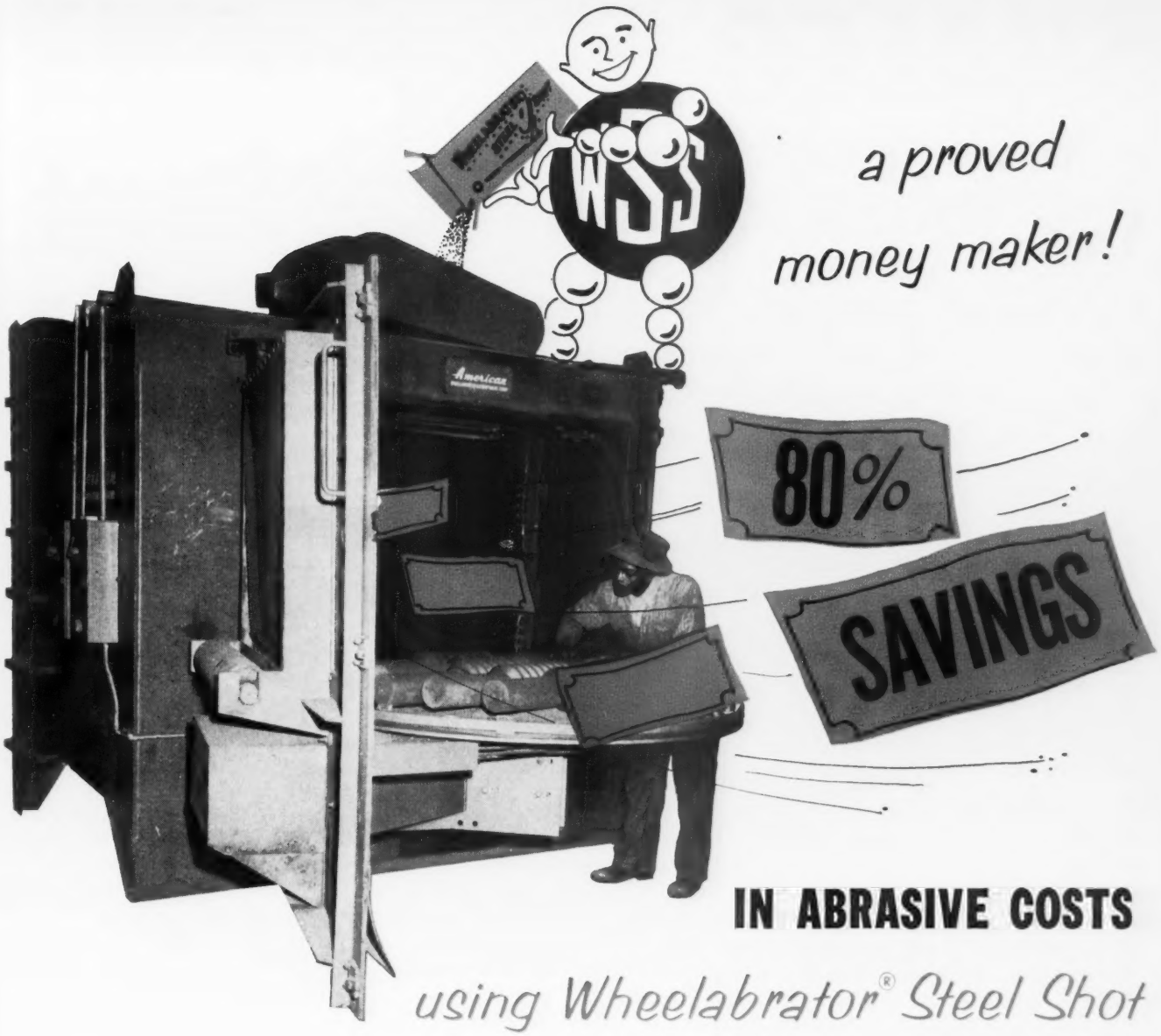
Prefer Iron Patterns

We prefer a close-grained, heat-treated alloy iron for pattern material. Various copper alloys, including beryllium copper, have been used with considerable success. As patternmakers become more familiar with the requirements of shell molding, pattern costs are coming down. It will help considerably if the number of surfaces on a pattern, Fig. 11, can be limited where extreme accuracy must be maintained.

All in all, we are exceedingly happy with shell molding in our shop. Many reports indicate that the demand for shell molded castings will exceed the supply for at least five years. Many foundries have not had the occasion to mechanize their green sand operation, and others have specialized on heavy and medium-sized casting work. These foundries may find that they can expand their output greatly with a medium capital investment by installing an automatic shell molding setup. Care must be taken, however, to analyze the available potential thoroughly before equipment is bought. The reason for this is to save on pattern cost by avoiding changes in pattern equipment at a later date to fit production shell molding equipment.

We at Production Pattern & Foundry Co. find shell molding easier and are cutting back on our squeezer operation to expand shell molding. We hope to be fully converted in a few years.

"Harold! My drier is full of little BB's!"



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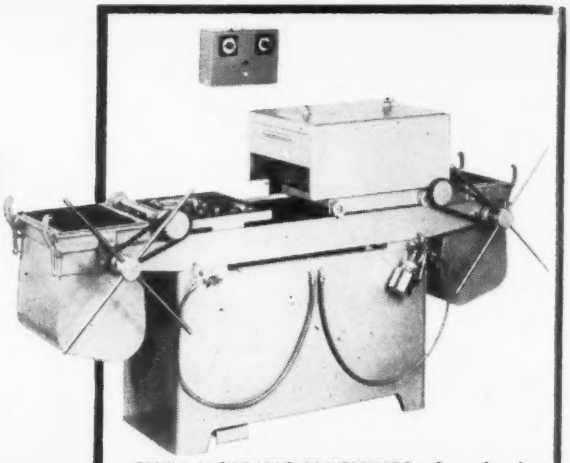
Shalco has consistently maintained its leadership in the pioneering development of high production, low cost shell molding equipment. Today, Shalco offers the most widely used foundry proven line of shell molding equipment and accessories.

Every unit carries with it the services of Shalco's foundry-trained field engineers, making available to you the most complete fund of technical knowledge in the shell molding industry.

⇨ Standardize throughout on Shalco equipment and supplies, backed by unsurpassed technical aids and services.

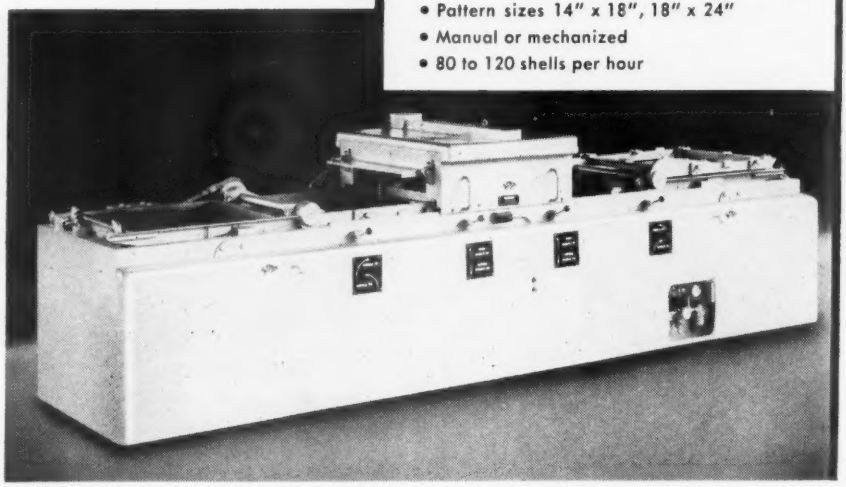
OTHER SHALCO PRODUCTS

For best results, specify Shalco pattern plates, master heater plates, silicone release agents, shell paste and other equipment and supplies for high production, low cost SHALCO SHELL MOLDING.



SHELL MOLDING MACHINES—Standard

- Pattern sizes 14" x 18", 18" x 24"
- Manual or mechanized
- 80 to 120 shells per hour

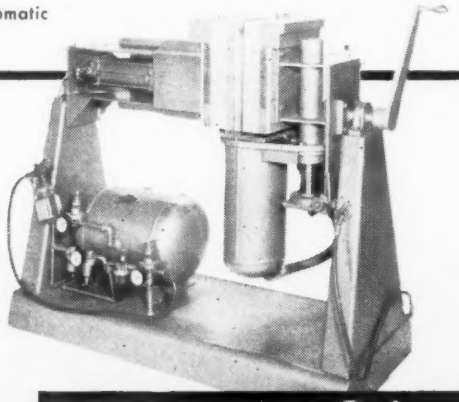


SHELL MOLDING MACHINES—Special

- Pattern sizes 20" x 30", 30" x 30", 24" x 36"
- Mechanized, semi-automatic, or automatic
- 80 to 120 shells per hour

SHELL CORE BLOWER

- Smooth, precise hollow cores for SAND MOLDS, PERMANENT MOLDS, and SHELL MOLDS
- Accommodates core boxes to 9"x12"x20"
- Eliminates core ovens and core driers
- 60 to 100 or more precision cores per hour, fully cured and ready for setting



VACUUM SHELL FUSER

- Shell sizes 14" x 18", 20" x 30", 30" x 30"
- Bonds shells securely, ready for pouring
- 100 complete shell molds per hour
- Pin type fusers also available

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Palo Alto, California

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Connellsville, Pennsylvania

MAN-TO-MAN

By RALPH L. LEE

The Gap between Knowing and Doing

"Many good things and ideas probably are tried and given up before enough practice is put into their use to get any good out of them"

AS AN amateur foundryman, I imagine that one of the most satisfying payoffs to professional foundrymen is to have a customer tickled pink with a job done for him. I've had such an experience just this past week—with a miniature locomotive builder, an automotive executive who's been coming to the Lee Hobby Foundry for the past ten years or more.

He's never been hard to get along with, even though he tried to make his own patterns. Although he's an excellent mechanic as far as the machine shop goes, he's pretty much all thumbs when it comes to patternmaking. But since he's a sharp individual (service manager of the largest motor car manufacturing outfit) with a keen interest in all the crafts and processes bearing on his work, his mind is literally an encyclopedia of just about every "how" entering into the manufacture and servicing of motor cars.

In the past we've managed to get castings (gray iron and brass) from every pattern he whipped up himself, although I must say it's been quite a struggle at times. This last time, however, his knowledge of patternmaking and molding was just enough to scare him away from tackling the patterns for two rather tricky brass castings involving cores. One was the stack of a miniature C. & O. freight locomotive—articulated, I think he called it—and the other a sort of double venturi arrangement on the underside of the stack, sticking down inside the locomotive shell in front of the boiler.

After looking at the blueprints, I could see why he shied off from the pattern job. After my customer left with my promise to deliver, I had an overpowering case of buck fever. Came near calling him up to be excused. I had made any number of coreboxes and cores in the past, but I had never tackled anything nearly so intricate or on such a small scale as these were.

Trying to get primed to start on this job, I remembered a trip I made a while back through the pattern engineering department of Saginaw Malleable Co. I decided to engineer these little patterns the way I saw them operate—that is, actually make pattern layout drawings and detailed drawings of each piece, with draft and everything, including separate bills of lumber. (The lumber bill was my own idea.)

I must admit that I felt kind o' silly up in the Lee Hobby Foundry trying to go through the same routine used in one of the largest outfits in the country. I didn't go as far as numbering each detail or lettering the title spaces, but I did bridge the gap between the theory I had gathered from seeing Saginaw operate and the actual practice in my own shop.

In spite of the time I spent in getting out the drawings, I honestly believe that I saved in the long run. I not only made time in getting out my lumber, but my campaign for attack was planned for every step of the way. With this done I found that I could concentrate on actually doing the work, without having my mind wander off onto the problem of how I was going to take the next step.

I made master layouts, of course, together with templates for the turning jobs—even a few little temporary fixtures for sanding or sawing some of the ornerier pieces. I used the surface gauge more than I usually do and once or twice used the mike. In fact, I got so wound up in all this that Mother (that's Mrs. Lee, the home superintendent and now chairman of the board) had one heck of a time getting me down to meals. I realize, of course, that this adventure of mine is merely every-day routine in our highly organized, super-duper patternmaking institutions.

I don't know whether I should mention this in polite patternmaker society, but I laid out some of the very small pieces on drawing paper, pasted the paper onto the mahogany and sawed and sanded to the drawings. Before I get through, I'm going to have air jets on my disc, spindle and belt sanders so I can see those doggone lines!

Without time and motion studies, I had the feeling that I saved time and did a better job by finishing each piece before assembly (gluing), including the radiuses on corners, fillets in tough-to-get-at spots and even finish sanding.

Speaking of fillets, some were too small for standard leather or wax. This point brings up pattern coatings and my inability to get anything to stick to wax except shellac. I imagine I have a sample of just about every kind of pattern coating material. On this job I decided to use lacquer on both patterns and coreboxes, with plastic wood fillets.

For years I've been trying to imitate a patternmaker I saw up in Minneapolis who rolled out plastic wood onto glass, cut it into neat, clean strips and tooled these strips into corners, making the slickest fillets a fellow would want to see. Every time I tried this stunt, it ended up in a mess.

By golly, this time I decided to get onto the trick or else! I kept at it, trying over and over again until I finally did it and then practiced doing it until I had it down pat. (By the way, I didn't charge my customer for this learning time.) The mistake I'd been making was having the plastic wood too dry and trying to tool it into place without nearly enough thinner and lacquer as a lubricant.

The point I'd like to make, though, is that these discoveries wouldn't have amounted to a whoop if I hadn't put in the practice it took to put them into dependable practice. Knowledge may be power, but I guess this power can't be used without practice.

I felt mighty good the way the patterns went together, the way the coreboxes worked, the patterns molded and the castings came out—

(*Concluded on page* 156)

SAN-BLO

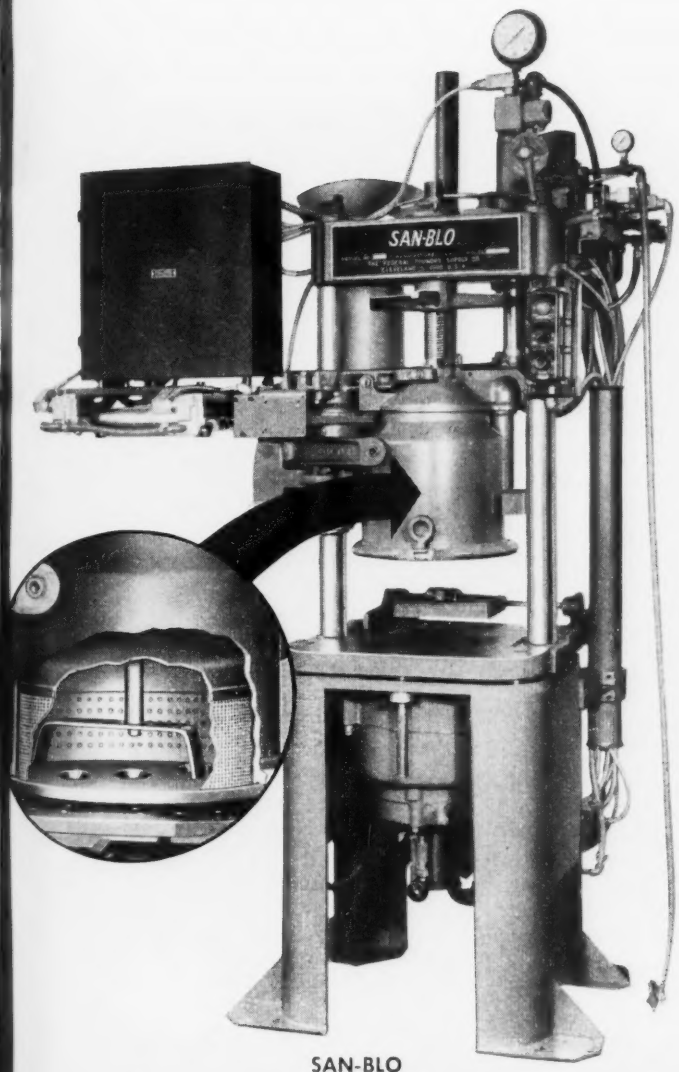
Section of the core room in a prominent mid-western production foundry. Cores shown were blown on SAN-BLO machines, in metal core boxes.

These three SAN-BLO machines blow cores for quick drying in a dielectric dryer. Eleven additional SAN-BLO core blowers are grouped around the tower oven

..FAST... VERSATILE!

WITH MINIMUM CORE BOX WEAR

HERE'S WHY SAN-BLO CORE BLOWERS ARE STANDARD *EQUIPMENT* IN SO MANY *PRODUCTION* FOUNDRIES . . .



SAN-BLO
CORE BLOWER
Model 40-D8-LPP

SPEED A number of *exclusive* features contribute to the SAN-BLO's unusually high speed. Its "cyclo-air" sand chamber is *never* changed—no time lost changing magazines! It blows all core sizes within machine capacity, and *all* of them at maximum efficiency. 80% of the sand magazine load is actually delivered into core boxes, so the magazine needn't be refilled after every blow. Changing blow plates is fast, too! It's done by merely lifting out a clevis pin and spreading a hinged clamp ring. *No unbolting!* Sand magazine is quickly adjusted to accommodate various height core boxes. This provides the shortest possible draw stroke and eliminates special "stooling" or machine modifications. The self-adjusting, oil-controlled draw, with automatic change from slow to fast, insures maximum speed and accuracy.

WEAR "Low pressure prefill", another *exclusive* SAN-BLO feature, minimizes core box wear opposite blow holes. A cushioning layer of sand is "riddled" into the core box, *before* full line pressure is automatically applied for ramming. There's no direct sand-blasting effect opposite blow holes—no need for replaceable, hardened-steel plates in the core box. Prefill pressure and timing are adjustable to suit all core boxes, so you really get fast, efficient core production on the SAN-BLO.

SAND The SAN-BLO's "cyclo-air" sand chamber, with motor-driven agitator and aerating air circuit, handles *all* practical foundry core sands with *equal efficiency*. It eliminates the need for special sand mixes, usually considered necessary because of core blowing machine limitations.

First step to take, to increase your core room production and reduce core costs, is to write our home office and request a sales-engineer to call.

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San-Blo Division

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(*Concluded from page* 153)

that is, after I corrected one boneheaded, humiliating boner. In spite of my split-hair efforts to do a super-duper accurate job, I made a mistake of ⅛-in. on the drawing of one of the core prints. I realize, of course, that such a dumb-cluck boner like this could happen only in the shop of an amateur.

I still say that patternmaking is one noble art, and I'm sure that I could be perfectly happy spending the rest of my days doing nothing else, provided I could get someone once in a while to talk to and listen to about it. But in spite of my love of talking about the art, it wasn't the principal reason for writing this little essay.

The real reason is the big gap which I have found from experience invariably exists between knowing of a way to do something, knowing how it is done and being able to do it myself. The pages of FOUNDRY are filled with the news of ways to do things plus materials and equipment to do them with. As time goes on, this material piles up into a practical library of money savers, quality improvers and business getters.

From my own experience I'd guess that many of these good things are tried and given up before enough practice is put into their use to get any good out of them—something like selling the piano after a couple of music lessons. The older I get, the more firmly I am convinced that we can fill our heads with KNOW OF and KNOW HOW without getting much benefit. We really don't know anything until we have practiced what we think we know until we can use it without thinking.

By the way, after fondling the castings I had made for him almost to the point of cooing, my friend was thrown into temporary shock when he learned how much time it took to make the two body patterns, the masters for the coreboxes, the cores and the castings. Although he understood theory, he was too shy on practice to visualize all that had to be done. He snapped right out of his shock, however, when he saw all of the stuff I had made for him. He even cooed a little as he left, promising to come back soon.

Book Review

1953 *Supplement to Book of ASTM Standards,* part 3, *Cement, Concrete, Ceramics, Thermal Insulation, Road Materials, Waterproofing, Soils,* 383 pages, 6 x 9 in., published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3.

Contains extensively revised standards and new and revised tentatives of the American Society for Testing Materials which have been accepted since the appearance of the 1952 *Book of ASTM Standards.* Fourteen of the 17 standards are replacements of existing standards and three standards represent tentatives adopted in 1953. Of 45 tentatives 15 are replacements, one is a standard revised and reverted to tentative while 29 are published for the first time. Yellow stickers accompany the volume for insertion in the proper places in the 1952 book to direct attention to changes in the standards and tentatives contained therein.

New Color Film Explains Die Casting Process

Product improvement and cost reduction through the use of the die casting process is the theme of a new film available from the American Zinc Institute Inc., 60 East 42nd St., New York 17. Showings of the 16-mm sound and color film are being booked now for technical and educational organizations. The American Die Casting Institute provides technical commentators and exhibits for each of the film showings. Booklets containing supplementary technical information are available for distribution among the audience following the showing of the film, "Die Casting—How Else Would You Make It?" The film makes a detailed examination of 45 die castings of various alloys. Latest design developments and production methods are shown in the 35-minute movie.

Book Review

ASTM Specifications for Steel Piping Materials, paper, 360 pages, 6 x 9 in., published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3. Price $3.75.

This 1954 edition contains in their latest approved form 53 widely used ASTM specifications for carbon-steel and alloy-steel pipe and tubing, including stainless. Materials covered are pipe for conveying liquids, vapors and gases at normal and elevated temperatures; boiler, superheater and miscellaneous tubes; still tubes; heat exchanger and condenser tubes. In addition specifications for related materials such as casings, forgings and welded fittings, and bolts and nuts are presented as well as the ASTM standard classification of austenite grain size in steels. American Standards for wrought steel and wrought iron pipe and stainless steel pipe also are a part of the book.

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AROUND THE COUNTRY

New York . . .

FOUNDRY business is spotty, but there should be shortly a return to at least the levels which prevailed prior to the year-end holiday and inventory season. Most foundrymen see some improvement even beyond that. Casting buyers have let their inventories run low and there appears to be a better tone to the metalworking industry in general, which should be reflected in a heavier consumption of castings.

Some leading gray iron foundrymen, while admitting that they are sticking their necks out a bit, predict that business in 1955 will be close to, if not back to the level of 1953. If so, this would represent a substantial pickup from the year just ended. They see a better year ahead in machine tools and other lines of machinery, another good year in automotive and construction work, a stepping up in railroad and shipyard requirements. They emphasize also that the period of inventory reduction is over.

Preholiday operations at gray iron shops averaged less than four days a week and somewhat higher at steel and malleable shops though still well under normal. Backlogs in all cases were relatively light, and, of course, with the holiday lull intervening, remain so.

Brass foundries are operating at well below normal, except those engaged particularly in construction requirements. For instances, meter and small valve requirements have stepped up, with some captive shops once again subletting work. Aircraft and radar work is engaging some aluminum shops at a good level.

Raw material supplies continue plentiful.

Detroit . . .

FOR MANY weeks it has been rumored that Ford Motor Co. planned to build a foundry at Livonia, Mich., for making either brake shoes or automatic transmission parts. It isn't. Consideration had been given to installing a foundry in the automatic transmission plant, but the idea was dropped. Sufficient foundry capacity was turned up at other company locations.

The modernization program of Pontiac Motor Division, General Motors Corp., Pontiac, Mich., is well on its way. Much new equipment has been added in all foundry departments to increase efficiency and, consequently, production. Most recent item put into production is an automated line for making 240 V-8 cylinder blocks an hour. One of the next installations will be a sand reclamation system. Completion of the program is seen within the next five months.

Complete foundry modernization also is underway at Dodge Division of Chrysler Corp. in Detroit.

On the other side of the picture is the closing of foundry facilities. Wilson Foundry & Machine Co., Detroit, has stopped castings production. Wilson was a subsidiary of the old Willys-Overland Motors Inc., which now is the Willys Motors Co., a subsidiary of Kaiser Motor Corp., Toledo, O.

Los Angeles . . .

FOUNDRYMEN are generally well satisfied with the current level of sales. The fourth quarter is usually marked by seasonable slowness, but November saw some steel foundries registering gains as high as 10 per cent over October. Nonferrous foundries are finding the going tougher, due to increasing competition and some price shading, but their fourth quarter will be at least as good as last year.

Although foundry prices have remained constant during most of 1954, trade observers foresee a slight increase in ferrous casting prices when union contracts are re-opened after the first of the year. Exorbitant union demands are not anticipated, but most foundrymen expect some price hikes to cover wage increases. The advances will be slight, they say.

The high level of activity is attributed primarily to increased requirements of casting users which have forced them to keep inventories higher than usual for this time of year. "One customer who called me only once last winter has been on my neck since September," one steel foundryman reports.

Some foundrymen point to this year's exceptionally heavy influx of special jobs as another reason for the high inventories held by casting users. When customers were purchasing on schedule, foundries were able to balance inventories accordingly. But with unexpected jobs popping from all directions, inventories have been kept unusually high in preparation.

To pool technical know-how and to share ideas and experiences, some of the leading foundries in this district have joined Industrial Manufacturing Services Corp., a nonprofit, cooperative trade group which aids industry in solving problems involving products, manufacturing and procurement. Members of IMSCO's executive staff include prominent steel and nonferrous foundrymen, including Frank Dayton, Dayton Foundry; Carlton B. Tibbetts, Los Angeles Steel Castings Co. and W. E. Holmes, Alloy Die Casting Co.

IMSCO makes available to Southern California foundrymen the counsel of more than 200 key industrial executives. They provide on-the-job technical assistance to streamline production, manufacturing and procurement methods in every phase of metalworking.

Members include: National Brass Works Inc., Alloy Die Casting Co., Harvill Corp., Dayton Foundry, H & S Metal Products Co., Kwikset Powdered Metal Products, Los Angeles Steel Castings Co., California Doran Heat Treating Co., Crest Molded Products Inc.

Chicago . . .

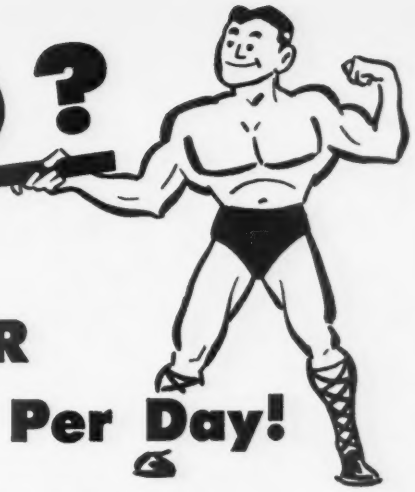
PAST presidents of the Chicago Chapter, AFS, have formed a Past Presidents' Club. The organization came into being Dec. 2 when several former heads of the chapter met for dinner at the Illinois Athletic Club upon the invitation of Harold W. Johnson, vice president, Wells Mfg. Co., Skokie, Ill., who was president of the chapter in 1937-38.

The group decided that president of the club should be the earliest available past president and that future presidents should follow in this progression. On this basis, James Thomson, chief works engineer, Continental Foundry & Machine Co., East Chicago, Ind., who headed the chapter in 1935-36, was elected president for 1954-55. John H. Owen, Chicago district sales manager, Harbison-Walker Refractories Co., Chapter president in 1952-53, was named secretary.

Purpose of the club is two-fold—"to

(*Continued on page* 161)

RUGGED?



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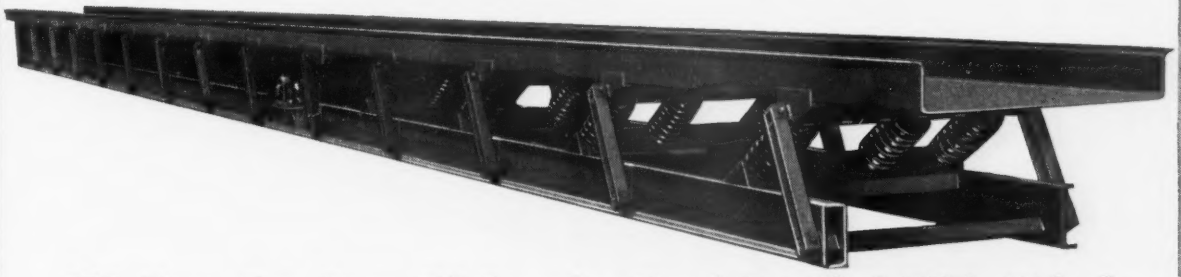
Carrier Natural-Frequency Conveyors are now delivering incomparably efficient, trouble-free performance for many of America's biggest industrials. Mail the coupon, *today*, for all the facts.



150 Tons Per Hour Of Foundry Sand Handled With 10 hp!

Handling up to 150 tons per hour of foundry sand — including occasional sprues and tramp iron — is a rough, tough job. But it's a *cinch* for this 70-foot Carrier Natural-Frequency Conveyor! This big Heavy-Duty unit has a 3/8" steel-plate pan, 36" wide, and is powered by one 10 hp drive. Vibrated weight is approximately three tons. More than 50 giant coil springs are used. Full details gladly sent on request.

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HIGH CONVEYING SPEED
(Up to 100 feet per minute)

GREATER CAPACITY
(Up to 200 tons per hour)

LESS POWER REQUIRED
(About one-third as much as "competitive" equipment)

LESS MAINTENANCE & DOWN-TIME
(Less power + good design = trouble-free performance)

NO DAMPENING UNDER LOAD
(Designed with extra power for specified load, with positive stroke)

SELF-CLEANING
(Continuous, smooth trough — no pockets)

COMBINES PROCESSING WITH CONVEYING
(Can screen, dry, cool, dewater, blend, etc.)

WIDTHS FROM 6" TO 48"—LENGTHS FROM 5' TO 250'
(With pans 16 ga to 1/2" plate, of any metal, open or enclosed)

BALANCED, VIBRATION-FREE UNITS AVAILABLE
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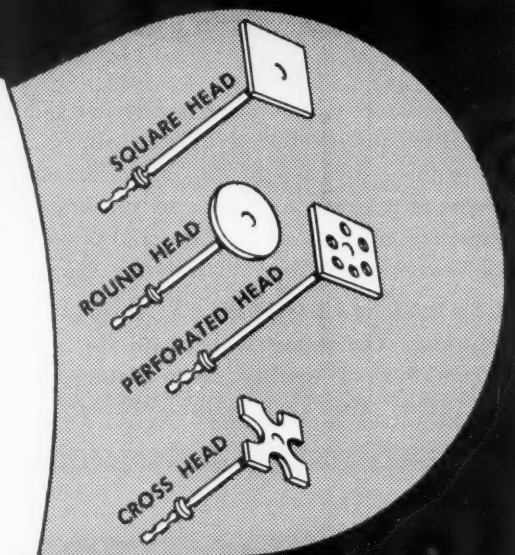

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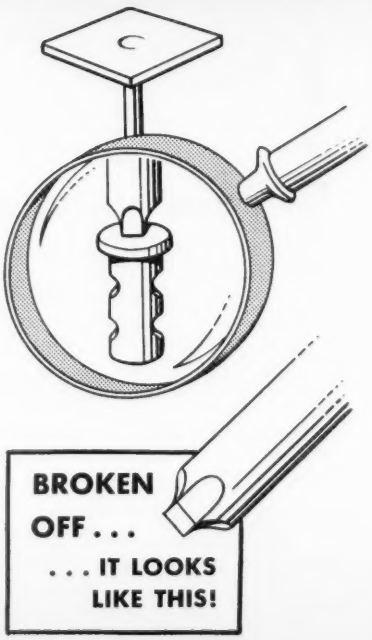

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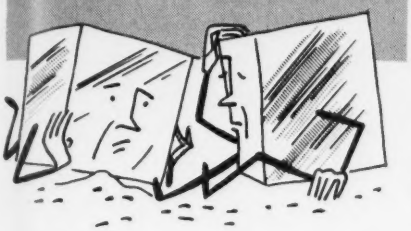
The case of the grounded ice cubes...



The operations of a Buffalo ice-making plant came to a costly impasse. Ice cubes were grounded for want of some way to unclog their transporting devices. Hammering was slow and often damaging to the equipment.

There was a solution, however, that solved the problem economically and swiftly . . . a CLEVELAND vibrator.

Let us know about ***your*** *grounded material, or ask for our detailed literature. Engineering recommendations without cost or obligation.*

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Bin Stuck Lately?

THE CLEVELAND VIBRATOR COMPANY

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(*Continued from page* 158)

provide a medium for preservation of valued friendships formed through past association with the Chicago Chapter, and to hold itself in readiness to render to the Chicago Chapter such service as may be requested by the officers and directors of the active chapter." Meetings will be held as required but not less than once each year.

The Chicago Chapter was established in 1934 and in the 20 years since that time there have been 21 presidents. Of this number, two are deceased and four reside outside the Chicago Chapter area, making a nucleus of 15 in the club at present.

The chapter will honor its past presidents at its regular meeting on Jan. 3 and at that time organization of the new club will be announced.

Philadelphia . . .

MOST foundrymen anticipate a speedy return to the operating levels which prevailed prior to the year-end holiday season and expect an even further increase over the next several weeks.

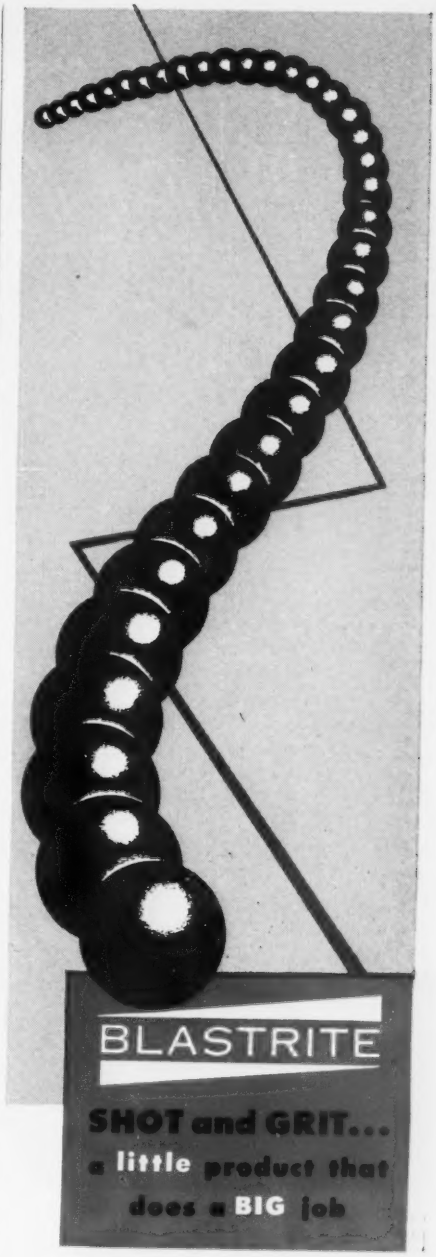
They look for casting demand to step up in line with the improvement which appears probable in metalworking generally and see more buying for inventories than has been the case in almost a year. There appears to be little doubt but what consumer stocks are lower than normal in many cases.

Prior to the holiday lull, district gray iron shops appeared to be averaging around 75 per cent of normal, with those engaged in soil and pressure pipe and in other items needed in the construction field leading. However, apart from these latter shops, gray iron foundrymen have little in the way of backlogs, possibly not more than the equivalent of a couple of weeks' operation or so.

Relatively, steel casting foundries are not operating as well, probably 60 per cent of normal, working four and five days a week, but with reduced working forces and shorter hours daily. Most steel foundries have backlogs running less than three or four weeks.

In malleable, shops specializing in pipe fittings are operating close to 100 per cent, it is estimated, and their backlogs are fairly extended, averaging six to eight weeks. Others, notably the job shops, are not doing better than 70 to 75 per cent. There is not too much in the way of automotive work in this area at any time. Hence, this demand is not the important factor that it is in some other districts, particularly in the Middle West. Moreover, there is a continued

(*Concluded on page* 163)



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For further information we invite you to contact our Sales and Metallurgical Department . . .

Home Office: **JACKSON, OHIO**

(*Concluded from page* 161)

lack of railroad demand and not too much in the way of valves.

Brass and bronze shops are hovering around 60 per cent of normal operation, with relatively little coming out from shipyards and government agencies. Where government business is available, specifications are so exacting that many shops are unable to figure, as they have not the facilities for handling such precision requirements. Light metal shops are averaging 80 per cent, with those engaged in aircraft and radar work operating at close to normal capacity. Backlogs, however, have declined.

Northwest Regional Draws 200 to Vancouver

ABOUT 200 members and wives attended the Fifth Northwest Regional Conference, held Oct. 15-16 at Hotel Vancouver, Vancouver, B. C. Conference was sponsored jointly by the Oregon, Washington, Oregon State College and British Columbia Chapters of the AFS in co-operation with the University of British Columbia.

Conference dinner speaker was Dr. James G. Parr, research associate, Dept. of Mining and Metallurgy, University of British Columbia. He presented an amusing talk on the development of metals under the title "Blood and Sand."

Technical sessions were held all-day Saturday. Following talks were given:

Steel Session: Speaker, Tim R. Stanley, plant superintendent, Consolidated Mining & Smelting Co. of Canada Ltd., Trail, B. C. Subject, "Manufacture of Steel Pots for Metal Processes."

Iron Session: Speaker, J. E. Rehder, director, technology & research, Canada Iron Foundries Ltd., Montreal. Subject, "Lower Cost and Better Quality Castings."

Non-Ferrous Session: Speaker, Arthur E. Cartwright, metallurgist, Crane Ltd., Montreal. Subject, "Some Reflections on, and Experiences in, Melting and Pouring Bronze."

Light Alloy Session: Speaker, Paul H. Hookings, Major Aluminum Products Ltd., Vancouver. Subject, "Practical Application of Fluid Flow to Gating and Risering Aluminum Alloy Castings."

Non-Destructive Testing Session: Speaker, Dr. P. J. Stewart, head, Radiograph Division, Isotope Products Ltd., Oakville, Ont. Subject, "Gamma Rays in Casting Inspection."

Chairman of morning sessions was W. M. Armstrong, associate professor, Dept. of Mining & Metallurgy, University of British Columbia. Chairman of afternoon sessions was Thomas Cowden, managing director, W. McPhail & Sons Ltd., Vancouver.—*J. T. Hornby, Balfour, Guthrie (Canada) Ltd.*

Division Changes Name

American Steel Dredge Co., Ft. Wayne, Ind., has changed the name of its Wayne Crane Division to Wayne Shovel & Crane Division. The division makes crane-excavators and industrial yard cranes.

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Scientific Advance in Head Protection

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Realizing that most fatal head injuries are due to shock to the brain rather than injury to the skull, the Cornell Aeronautical Laboratories designed and patented a new suspension system for industrial safety hats that provides maximum protection and comfort to the wearer.

This patented suspension is available only in Willson Super-Tough® Hats and Caps!

This suspension is made up of "geodetic" crown straps scientifically located to distribute the force of a blow over the entire head—not concentrate it in a small area on the crown of the head. In addition, the tough Fiberglas hat shell is made safer and more comfortable to wear by the pneumatic cushioned head band. This pneumatic cushion absorbs and distributes the force of lateral blows through a series of metered, interconnected air cells.

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Please send me your bulletin on the new Willson Super-Tough® Hats and Caps with "geodetic" crown straps and "pneumatic" head band.

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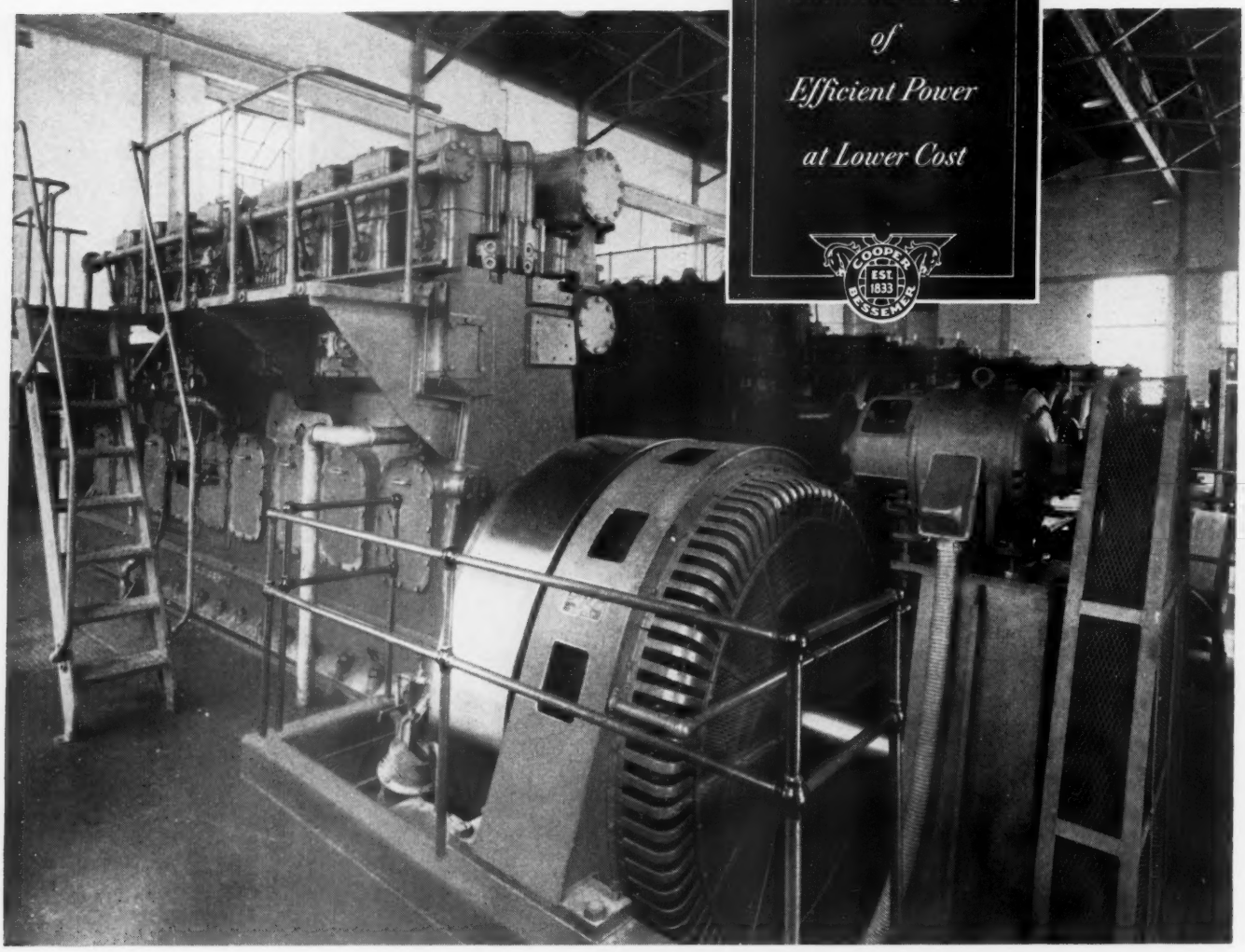
Interior of Hearne's municipal power plant with latest 1715 hp Cooper-Bessemer supercharged Gas-Diesel in foreground. City Manager N. L. McCarver reports that engine's fuel and lube cost averages .00252 mills per kwh.

Another Example of Efficient Power at Lower Cost



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Cooper-Bessemer Gas-Diesel Power!

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Hearne's base generating load is carried by two Cooper-Bessemer Gas-Diesels — 1000 hp and 1,715 hp units installed in 1947 and 1950 respectively. Fueled mostly by gas, these modern, exceptionally efficient engines last year operated at a fuel cost of only $0.002755 per kwh compared with $0.00465 for older type oil burning engines in 1946.

Says City Manager N. L. McCarver, "We made a good investment in our Cooper-Bessemers. They are not over-rated and will pull their load without the least bit of trouble. The new turbocharged engine is now down for annual check-up and is the cleanest engine we ever saw."

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● For further information on helpful literature, trade publications, and new equipment descriptions, please refer to IDEAS FOR FOUNDRYMEN insert and return cards on page 199.

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JANUARY 1955

IFC	26	53	114-5	154-5	190	214	231B	246TR
1	27	54	117	156-7	191	215L	232	247T
2	28	55	119	159	192	215R	233	247BL
4-5	29	56-57	120	160	193	216	234T	247BR
6	30	58	122	161L	194-5	217L	234B	248L
7	31	59	124-5	161R	198	217R	235	248R1
8	32	60	127	162	201	218T	236	248R2
9	35	61	129	163	202	218B	237	248R4
10	36-37	62	131	164	203T	219L	238L	249T
11	38	63	132	167	203B	219R	238BR	249BL
12	39	64	134-5	169	205	221	239	249BR
13	40	65	137	171	206	222	240T	251R
14	41	66	139	173	207	223	240B	260T
15	42-43	99	141	174	208L	224	241R	260L3
16-17	44	101	142	175	208R	225	243T	260R2
18	45	103	143	176	209	226	243BL	260R3
19	46	104	144	179	210L	227	243BR	260-4
20	47	107	147	182-3	210R	229	245TL	263
21	48-49	109	149	185	211	230L	245BL	264
22-23	50	111	151	186	212	230R	245R	IBC
24	51	112	152	189	213	231T	246L	OBC
25	52							

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JANUARY 1955

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7	31	59	124-5	161R	198	217R	235	248R1
8	32	60	127	162	201	218T	236	248R2
9	35	61	129	163	202	218B	237	248R4
10	36-37	62	131	164	203T	219L	238L	249T
11	38	63	132	167	203B	219R	238BR	249BL
12	39	64	134-5	169	205	221	239	249BR
13	40	65	137	171	206	222	240T	251R
14	41	66	139	173	207	223	240B	260T
15	42-43	99	141	174	208L	224	241R	260L3
16-17	44	101	142	175	208R	225	243T	260R2
18	45	103	143	176	209	226	243BL	260R3
19	46	104	144	179	210L	227	243BR	260-4
20	47	107	147	182-3	210R	229	245TL	263
21	48-49	109	149	185	211	230L	245BL	264
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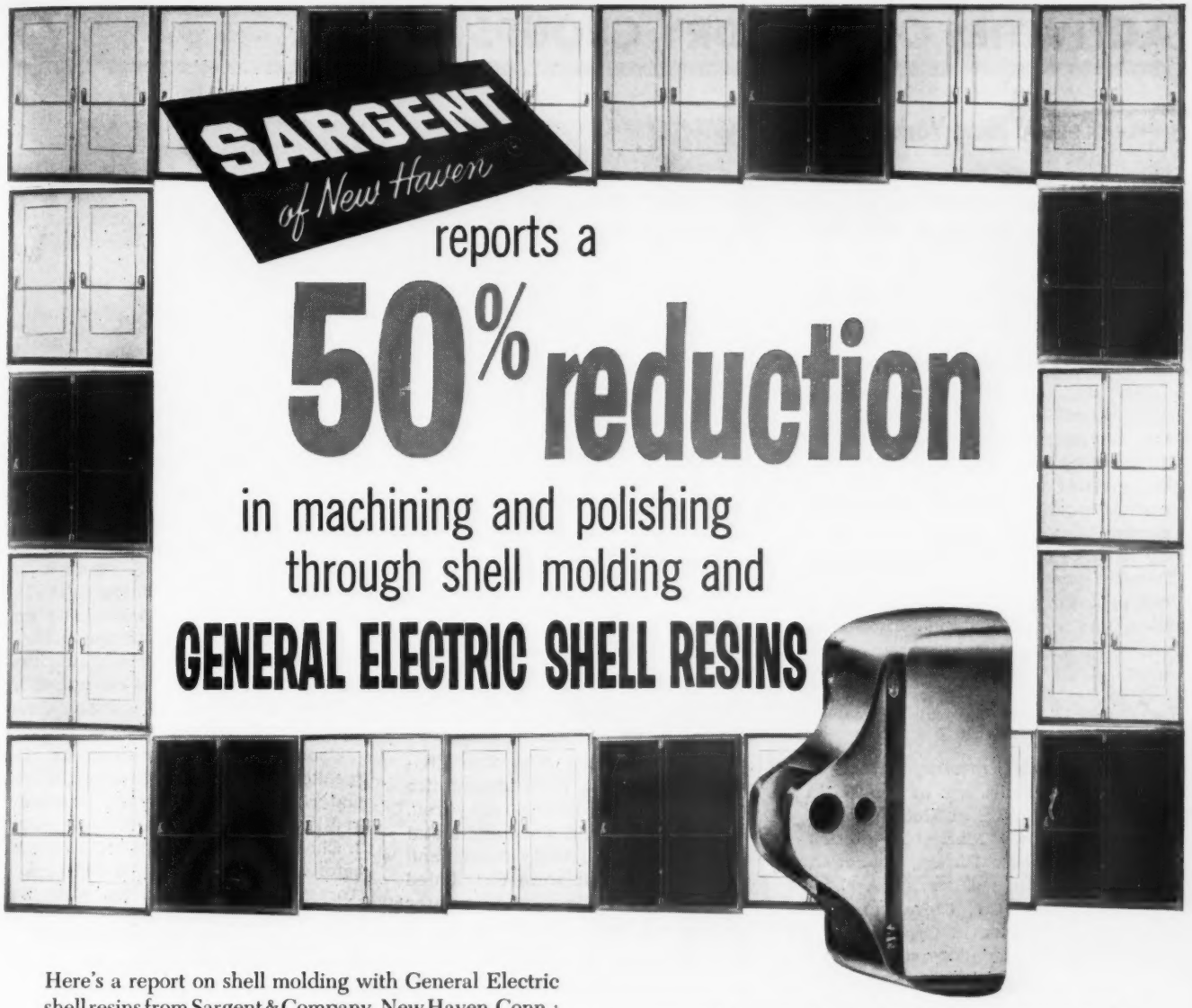
FURTHER INFORMATION on any of the advertisements in this issue may be obtained by circling the page numbers of advertisements on one of the attached cards. Fill in your name and address, return your card to us—we'll forward your requests to the companies concerned. Further information on their advertisement will come direct to you from the advertiser. *Note: where more than one advertisement appears on a page, the following code is used for identification:* R (right); L (left); T (top); B (bottom); 1-2-3-4 (in order from top to bottom); IFC (inside front cover); IBC (inside back cover); OBC (outside back cover).

● For further information on helpful literature, trade publications, and new equipment descriptions, please refer to IDEAS FOR FOUNDRYMEN insert and return cards on page 199.

FOUNDRY Readers Service



SARGENT of New Haven reports a

50% reduction

in machining and polishing through shell molding and

GENERAL ELECTRIC SHELL RESINS

Here's a report on shell molding with General Electric shell resins from Sargent & Company, New Haven, Conn.:

"Shell molding with G-E shell resins has proved ideal for producing parts for our new line of 'Quick' Exit Devices. The shell process permits the use of hard, high-grade bronze—resulting in a completed product unsurpassed in finish and texture."

Machining, polishing operations cut in half! "Parts are *sounder*—have more uniform grain structure. They're *smoother*—free from surface gas holes. *Machining and polishing operations were reduced by 50%*. Over-all result: a product better in both strength and appearance, produced more quickly and easily, with faster deliveries so important to sales."

Sargent uses three General Electric shell-molding products to turn out "Quick" Exit Device parts: **G-E 12374 phenolic shell-molding resin** to form light, dimensionally accurate molds, **G-E SM-55 silicone parting agent** to secure quick, easy release of molds from patterns, and **G-E 12316 bonding resin** to cement shell halves together.

FREE BOOKLET AVAILABLE

How can shell molding help YOU? General Electric, a major supplier of molding and release agents for the shell process, has prepared an informative 28-page manual telling about the techniques and benefits of this new foundry method. *Just mail the coupon for a free copy!*

SEND COUPON TODAY FOR SHELL-MOLDING DATA!

General Electric Company
Chemical and Metallurgical Division
Section 1418-4A,
Pittsfield, Massachusetts

Please send me a free copy of *G-E Shell Molding Manual.*

☐ We are presently using the shell-molding process.
☐ We are interested in the shell-molding process.

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GENERAL ELECTRIC

ACTIVITIES OF FOUNDRY GROUPS

Central New York

THE Roof Garden, Onondaga Hotel, Syracuse, N. Y., was the site of the Nov. 12 meeting of Central New York Chapter of the AFS, with 96 members attending. J. Thomas Coggin, metallurgist, Elmira Foundries, General Electric Co., talked on "Practical Application of Statistical Quality Control in the Foundry."

Mr. Coggin used slides to show "out of control" situations taken from his company's operations. At GE daily scrap meetings are held with the general foreman, molding, coreroom, cleaning room foremen, metallurgist, inspection foreman and quality control technician attending. Speaker stated that a quality control program was essential, and to be successful, must be simple, up-to-date, and posted where all can see.—*Bruce R. Artz, Pangborn Corp.*

CENTRAL NEW YORK Chapter of the AFS held its annual plaque presentation to the immediate past chairman at its November meeting. Above, left to right, L. D. Wright, U. S. Radiator Corp., national director, AFS, D. J. Merwin, Oriskany Malleable Iron Co., past chairman, 1952-53, and J. A. Feola, Crouse-Hinds Co., chairman, 1953-54, and recipient of plaque. Photo by Robert G. King

Wisconsin

FIVE sectional meetings featured the Nov. 12 meeting of Wisconsin Chapter of the AFS at Hotel Schroeder, Milwaukee. Malleable section heard Warner B. Bishop, manager, Foundry Products Division, Archer-Daniels-Midland Co., Cleveland, talk on "Common Sense in Cores."

Steel section was addressed by John Rassenfoss, engineer, American Steel Foundries, East Chicago, Ind., who spoke on "Sand Reclamation." Gray iron section listened to a report on "Mechanization of the Small Foundry" by Lester B. Knight, president, Lester B. Knight & Associates Inc., Chicago.

At the Nonferrous section meeting Chester R. Polanski, consultant, Kenosha, Wis., talked on "Foundry Sand Control." "D Process and Equipment" was the subject of Frank S. Brewster, vice president and general manager, Harry W. Dietert Co., Detroit, before the pattern section.

It was announced that five divisions of the 1955 AFS Apprentice Contest are officially open—gray iron, nonferrous, steel, and wood and metal patternmaking. Eligibility details and general information were distributed to members as a stimulant to greater participation.—*John E. Hubel.*

Metropolitan

MORE than 100 members and guests of Metropolitan Chapter of the AFS met Nov. 1 at the Essex House, Newark, N. J., to hear talks by T. E. Barlow, sales manager, Eastern Clay Products Dept., International Minerals & Chemical Corp., Chicago, and Hans Hinrichs, Federal Foundry Supply Co.

Mr. Barlow discussed the theory, practice, and present applications of high-pressure molding, with emphasis upon the varying degrees of dimensional tolerance and surface finish obtainable.

Mr. Hinrichs talked on the use of core blowing equipment for production of green sand molds and cores. He discussed a number of techniques used in adapting coreblowing equipment for mold blowing, including box design and location and relationship of corebox vents and blow holes for best efficiency.—*Seymour B. Donner, Copper Alloy Corp.*

Philadelphia

PHILADELPHIA Chapter of the AFS met Nov. 12 at the Engineers Club, Philadelphia, and heard George Anselman, consultant, speak on "Quality Control." Among the 156 who attended were 18 students and 2 professors from Pennsylvania State University. Mr. Anselman stated that quality control could be simplified by plotting all controls on a chart, eliminating much writing and figuring.

Good control, according to the speaker, starts with purchase of raw materials. Three steps are necessary in all quality control work: 1. Specify. 2. Check. 3. Reject. All should be done before material is used. Handling and storage of raw materials also was pointed out as vital and essential as was the need for good supervision, workmanship and equipment.—*C. R. Sweeny, Atlantic Steel Castings Co.*

Rochester

USE of radiography in nondestructive testing of castings was explained to members of Rochester Chapter of the AFS at their Nov. 9 meeting by Roy G. Tobey, X-Ray Division, Eastman Kodak Co. Mr. Tobey stated that x-ray is the best known method of testing castings by nondestructive means. He used slides

(*Continued on page* 170)

WISCONSIN Chapter of the AFS met in November in Milwaukee. Following dinner, the chapter adjourned into five smaller groups to hear talks by foundry experts on a variety of subjects. Above, left to right, are speakers and chairmen: Frank S. Brewster, Harry W. Dietert Co.; H. W. Stokes, Waukesha Foundry; Henry Seebath; Chester R. Polanski, consultant; Eric Wussow, Kaukauna Foundry & Machine Co.; Lester B. Knight, Lester B. Knight & Associates; Warner B. Bishop, Archer-Daniels-Midland Co.; Prof. R. W. Heine, University of Wisconsin; John Rassenfoss, American Steel Foundries, and D. C. Zuege, Sivyer Steel Castings Co. Photographs through the courtesy of Walter C. Napp, Delta Oil Products Co.

Power-Packed for Profit...

SHOT OR GRIT . . . that's Malleabrasive. Malleabrasive is scientifically heat-treated and laboratory controlled to clean *better, faster,* and last *longer.* Malleabrasive cleans *cheaper* because you save on parts repair and down-time . . . because its long life cuts abrasive purchases. Don't take our word for it. Prove it to yourself. Next time you buy blast cleaning abrasive, specify Malleabrasive from Pangborn Corporation, 1400 Pangborn Blvd., Hagerstown, Md.

Look to Pangborn for the right abrasive for every blast cleaning job.

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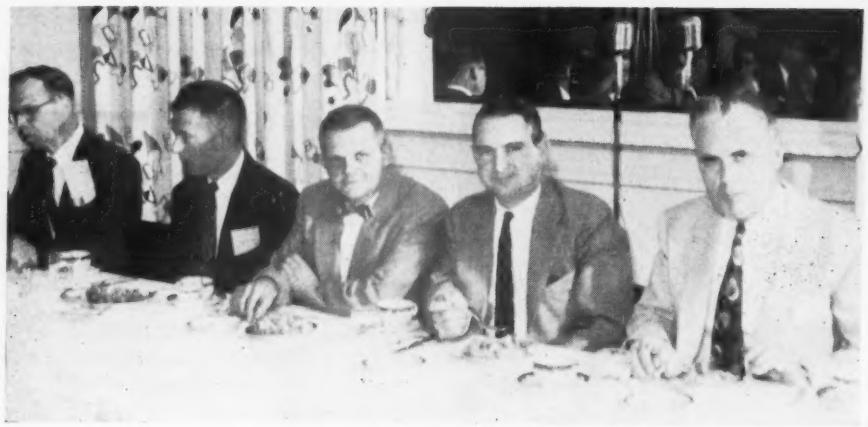
Pangborn BLAST CLEANS CHEAPER
with the right equipment for every job



CENTRAL OHIO Chapter of the AFS met in Springfield, O., in November to hear Warner B. Bishop, manager, Foundry Products Division, Archer-Daniels-Midland Co., Cleveland, speak on "Common Sense In Cores." Left to right above are N. H. Keyser, Battelle Memorial Institute, chapter vice chairman; George B. Greenwood, student, Ohio State University; Ray Meyer, Ohio Steel Foundry Co., chapter chairman; Warner B. Bishop, featured speaker, and Tom Kusack, O. S. Kelly Co. Photograph by Courtesy of Eldon Boner, Cooper-Bessemer Corp.

(*Continued from page* 168)
to illustrate applications made possible following x-raying of trial castings.—*H. G. Stellwagen, Hetzler Foundries Inc.*

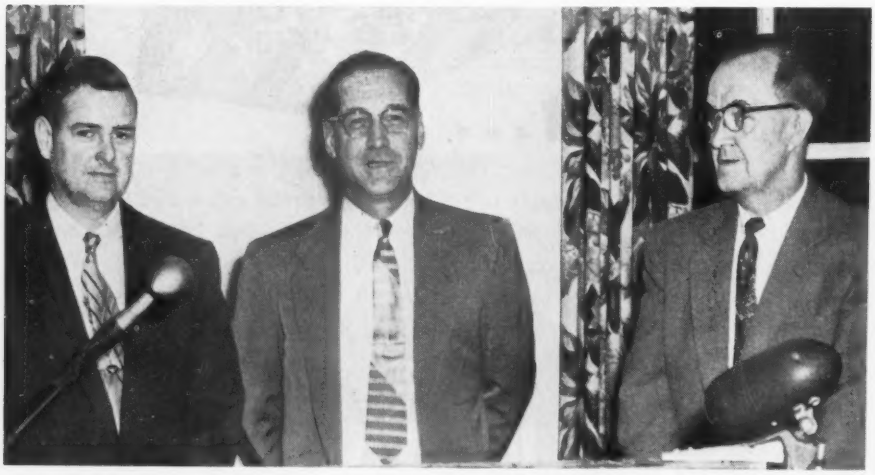
Saginaw Valley

TWO speakers discussed "Foundry-Machine Shop Relationships" at the Nov. 4 meeting of Saginaw Valley Chapter of the AFS at Frankenmuth, Mich. Thomas A. Lawton and Harold Weaver, Buick Motor Division, General Motors Corp., spoke for the machine shop and foundry, respectively.

Mr. Lawton talked of "hidden taxes" that cause losses in the machine shop, namely, scrap rate and its effect on machining capacity, cracked castings and their effect on cost due to time loss, dimensional inaccuracy of locaters and their effect on tool and machine breakage, excess stock, and variable machinability and its effect on tool cost and capacity. Mr. Weaver called the foundry the creative center of industry and admitted that some defective castings cause losses in machining, but emphasized it is necessary to distinguish between foundry defects and other causes of machine shop losses. —*Nicholas Sheptak, Dow Chemical Co.*

Connecticut Non-Ferrous

CONNECTICUT Non-Ferrous Foundrymen's Association met at the New Haven Country Club, New Haven, Conn., on Oct. 20 and Nov. 17. Speaker at both meetings was Frank S. Brewster, vice president and general manager, Harry W. Dietert Co., Detroit. His subject, "How to Get More Production Through Sand Control." Mr. Brewster said that good sand control is a vital tool for reducing losses and improving quality but also is a potent means of increasing production. In his two talks Mr. Brewster pointed out a multitude of functions, now commonly performed, that would be eliminated or reduced through installation of an intelligent sand control program.—*Frank B. Diana.*



SAGINAW VALLEY Chapter of the AFS met at Frankenmuth, Mich., in November to hear a lively panel discussion of "Foundry—Machine Shop Relationships." Panelists, left to right, above, were Thomas A. Lawton and Harold Weaver, both of Buick Motor Division, General Motors Corp., and Carl Tobias, General Motors Institute, chapter technical chairman and discussion moderator. Photograph is through the courtesy of E. H. Mossner.

Twin City

FIFTY college and high school students, their instructors and representatives of several education and apprenticeship groups in the Twin City area were guests of Twin City Chapter of the AFS at its Nov. 9 meeting at the Covered Wagon Restaurant, Minneapolis. This annual meeting is designed to let students and potential foundrymen meet foundrymen with an insight and learn about the industry's technical progress.

George T. Boli, president, Northern Malleable Iron Co., addressed the group on "The Foundry Needs Engineers." He pointed out the need for engineer-type thinking in the industry today. Sales engineers are especially needed to provide customer service, recognize potential applications for castings where forgings and weldments are now used and to consult intelligently with prospective customers' engineering departments. —*R. J. Mulligan, Archer-Daniels-Midland Co.*

Pittsburgh

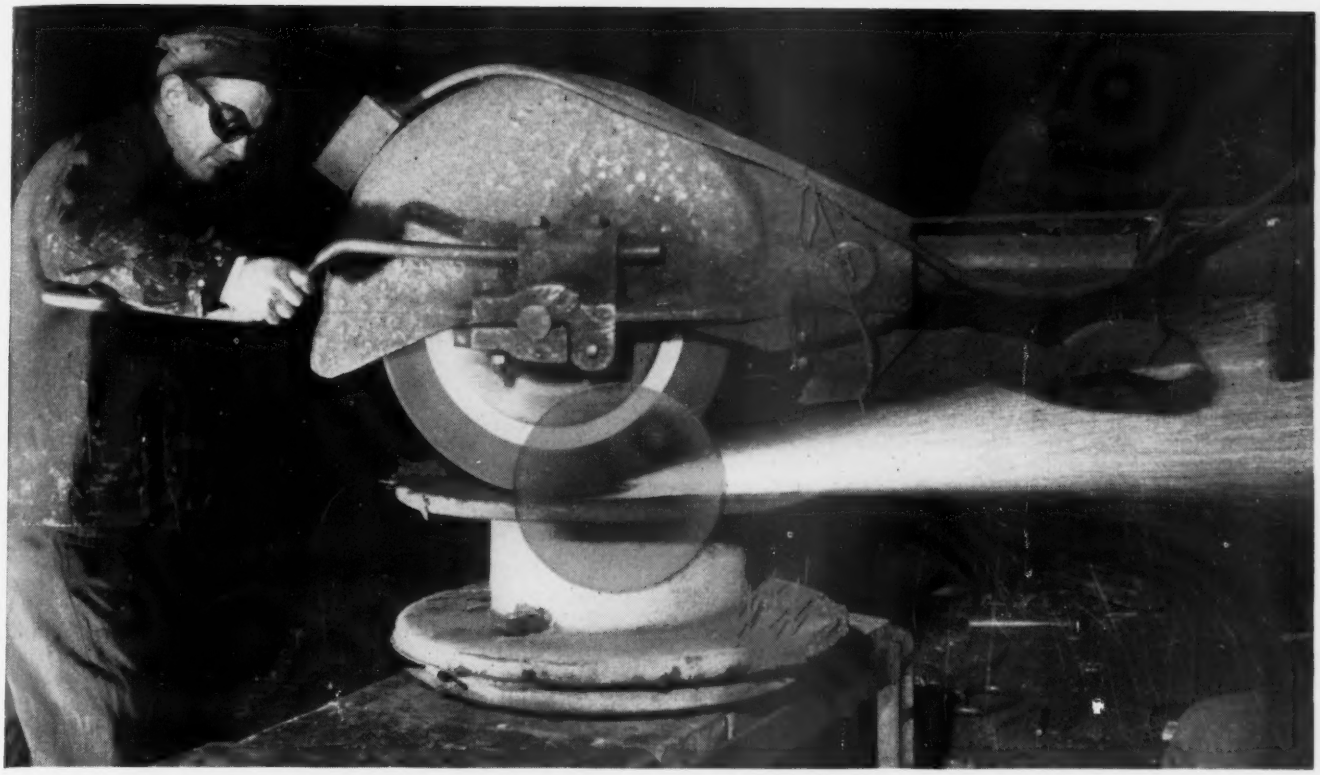
APPROXIMATELY 115 members and guests of the Pittsburgh Foundrymen's Association met Nov. 15 at Webster Hall Hotel, Pittsburgh, to hear Aubrey Grindle, Grindle Corp., Harvey, Ill., speak on dust, smoke and fume control. The group again discussed possible affiliation with the American Foundrymen's Society but no action was taken.

Mr. Grindle's subject was timely as smoke control laws in Pittsburgh are being tightened. He pointed out that foundrymen have a background of experience on good techniques of fume control, smoke control, and air pollution. Methods of cleaning up cupola emissions were described along with a presentation of slides showing equipment in the development stage at Grindle Corp. and other firms.—*Robert Love.*

Ohio State

OHIO State University Student Chapter of the AFS met Nov. 2 in the school's Industrial Engineering Building. Twelve chapter members attended to hear Arthur Agostini.

(*Continued on page* 172)



Fast cutting action plus extra long life is the "Touch of Gold" combination that makes Norton ALUNDUM resinoid wheels unbeatable for rough grinding steel.

How to grind steel castings more profitably...

Norton ALUNDUM* wheels are engineered to bring you the time-and-money-saving, value-adding

"TOUCH of GOLD"

Here's one good way to find out how Norton wheels can improve your cleaning room operations.

Ask your shopmen.

On steel castings, for example, they'll tell you that Norton ALUNDUM wheels handle easier (they hug the work), remove stock faster and last longer.

Another good way is to compare your cleaning room costs — testing Norton wheels against any others. You'll find that the expertly engineered "Touch of Gold" performance of Norton wheels saves you money on every rough grinding job — from lightest portable to heaviest swing frame work.

See your Norton distributor for the Norton wheels that are exactly right for your jobs. Get the answers to such variables as: shape, type and analysis of the casting, type of grinding machine, area of wheel contact, amount of pressure applied, etc. Ask him for the fully illustrated booklet: *Rough Grinding.* Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your classified phone directory. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

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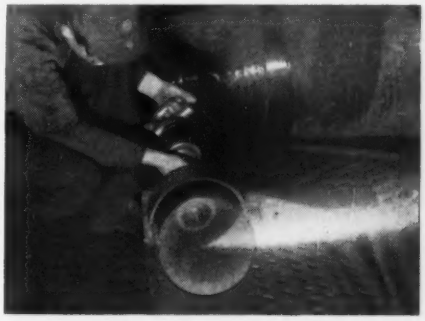
Get twice the efficiency from your floor or bench grinders by using Norton wheels on both ends of your machines.



Rough grinding steel castings with portable machines is faster, easier, more economical — thanks to Norton ALUNDUM abrasive and Norton-developed resinoid bonds.

Making better products... to make your products better

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and its BEHR-MANNING division

NORTON: Abrasives • Grinding Wheels • Grinding Machines • Refractories
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*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

BIRMINGHAM Chapter of the AFS held its traditional November meeting at Anniston, Ala., and was treated to two panel discussions tailored to ferrous and nonferrous interests. The nonferrous panelists are shown above, left to right: Morris Hawkins, foundry superintendent, Stockham Valves & Fittings Inc., moderator, Frank Lane, sand control engineer, Stockham Valves & Fittings Inc., Robert Carr, general superintendent, Lee Brothers Foundry, and A. H. Turner, superintendent, Dixie Bronze Co. Photo by J. A. Wickett, U. S. Pipe & Foundry Co.

(*Continued from page* 170)
plant manager, Grede Foundries Inc., Milwaukee, speak on "The Relationship of the President and the Sweeper."

It was announced that 13 students would share in scholarships and awards provided by the Foundry Educational Foundation, University Development Fund and Industrial Engineering Dept.

On Nov. 11 a group of 25 chapter members and guests toured the Ford Motor Co.'s foundry and engine plant in Cleveland. Transportation for the trip was provided by the Central Ohio Chapter.—*W. Fred Clutton.*

Birmingham

JEFFERSON Davis Hotel, Anniston, Ala., was the location of the Nov. 19 meeting of Birmingham Chapter of the AFS, with 127 members and guests attending.

The ferrous group heard a panel discussion of synthetic sands for heavy and medium gray iron and steel castings, sand practice for small gray iron castings, resin bonded sands for coremaking and shell molding, and phenolic core binders. Panel members were J. C. Cranford, research engineer, American Cast Iron Pipe Co.; Walter Gann, sand engineer, M & H Valve & Fittings Co.; E. C. Finch, foundry superintendent, American Cast Iron Pipe Co., and George Vann, manager, Newbury Mfg. Co.

Nonferrous group adjourned to the YMCA, adjacent to the hotel, to hear a general panel discussion by Frank Lane, sand control engineer, Stockham Valves & Fittings Co.; R. B. Carr, general superintendent, Lee Brothers Foundry, and A. H. Turner, superintendent, Dixie Bronze Co.—*J. A. Wickett, U. S. Pipe & Foundry Co.*

Toledo Chapter of the AFS toured the Defiance, O., plant, Central Foundry Division, General Motors Corp., on Oct. 22. Speaker's table above is shown prior to tour. Left to right: R. C. Van Hellen, Bunting Brass & Bronze Co., past chapter secretary; Thaddeus Giezczak and Karl A. Koerner, chief metallurgist and plant manager, respectively, Central Foundry; C. E. Eggenschwiler, Bunting Brass & Bronze Co., chapter chairman, and T. R. Schroeder and J. B. Malone, factory manager and chief plant engineer, respectively, Central Foundry.

St. Louis

APPROXIMATELY 75 members and guests of St. Louis Chapter of the AFS met Nov. 11 to hear Michael R. Gallo, metallurgical engineer, Great Lakes Carbon Corp., talk on "Coke and its Relation to Cupola Operations." A film, "The Magic Stone," produced by the Great Lakes Carbon Corp. was a feature of the program.

During his talk he evaluated the factors influencing coke efficiency with emphasis on carbon content of coke, and discussed tuyere ratios with a recommendation that they be held between 1 to 2.5 and 1 to 4.5. Physical properties of the coke—size, strength, shape—have great bearing on cupola efficiency and it is essential to maintain coke properties at the optimum point.

On Nov. 17, nine members of the chapter went to Rolla, Mo., for a meeting of the Missouri School of Mines Student Chapter, AFS. George Mitsch, A.C.F. Industries, St. Louis, vice chairman of the St. Louis Chapter, addressed the students on "Do Foundries Need Engineers," and then conducted a forum discussion on the subject.—*J. R. Bodine Jr., Bodine Pattern & Foundry Co.*

Toledo

A TOUR of the Defiance Plant, Central Foundry Division, General Motors Corp., served as the agenda for 95 members at the Oct. 22 meeting of Toledo Chapter of the AFS. Carl A. Koerner, plant manager, welcomed the group and spoke briefly about the history and progress of the operation.

An expansion program is in progress and the visitors had a chance to see some of the planned additions, including plant facilities and employee conveniences that will add 200,600 sq ft of floor space. Foundry, melting, molding, core, finishing, pattern, maintenance and laboratory departments are all being enlarged and supplied with additional equipment.

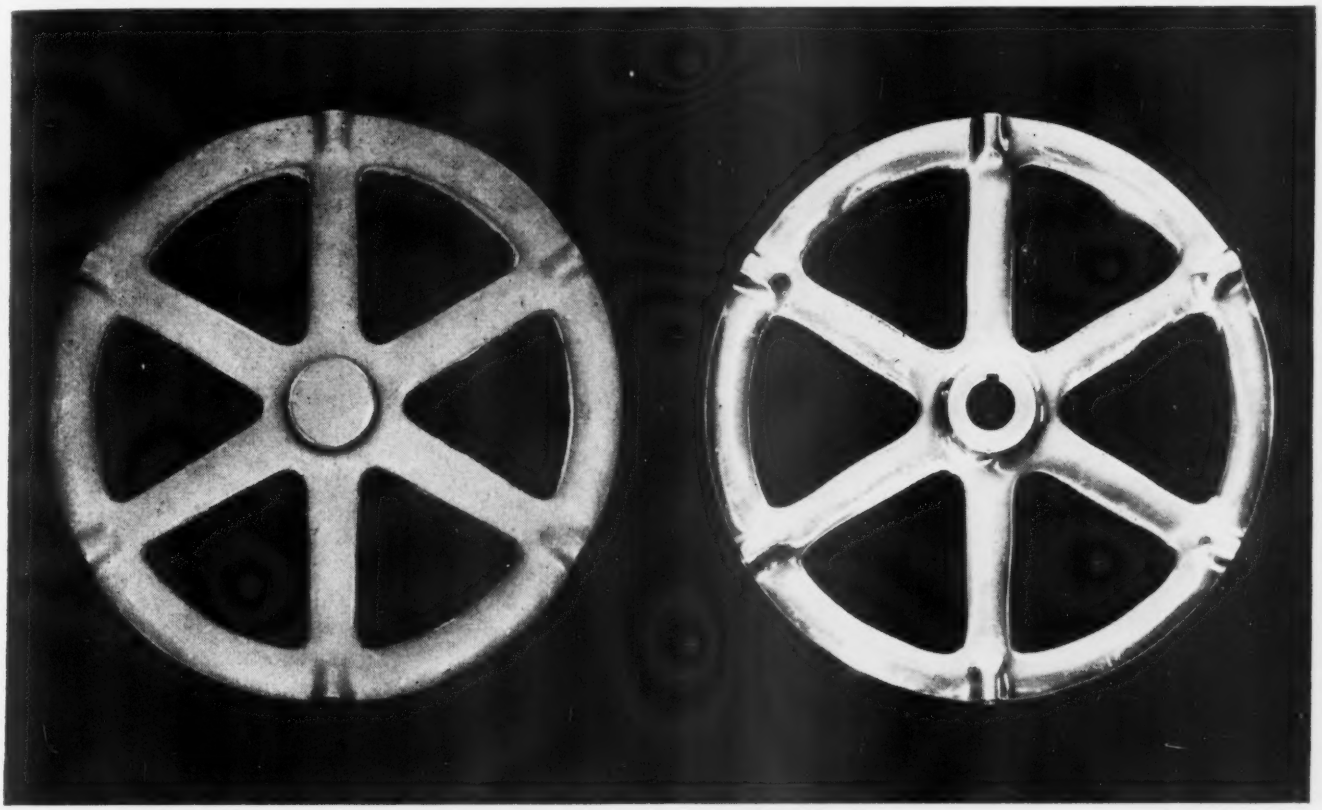
Following the tour, a movie featuring James H. Smith, general manager, Central Foundry Division, was shown. Film illustrates some of the new developments in shell molding and emphasizes the importance of improved methods in foundry operation.—*R. S. Smith Jr., Central Foundry Division, General Motors Corp.*

San Antonio Section

ABOUT 35 members and guests of San Antonio Section of Texas Chapter of the AFS met Nov. 22 at the Alamo Iron Works, San Antonio, to see a color film "Production of

(*Continued on page* 174)

3M METHOD—better from start to finish



Brooklyn manufacturer doubled production with 3M Abrasive Belts!

10 Finished Wheels per belt! *3M Coated Abrasives are production "tools" scientifically manufactured to do a better, faster grinding and finishing job.*

Yes, Perkins Marine Lamp and Hardware Co. doubled their production of finished bronze marine steering wheels when they switched to the 3M Method using 3M Abrasive Belts. This maker of fine hardware for sea-going pleasure boats formerly used grinding wheels —averaged only 1 polished casting per hour. Now, with 3M Abrasive Belts, unit costs have been cut 50%, with far better finishes.

3M Coated Abrasives can do a job for you, too. Your 3M Representative is an abrasives expert who can help you install the 3M Method. Send coupon today for facts. There's no cost or obligation.

Write Today for FREE Booklet!

Made in U.S.A. by Minnesota Mining and Mfg. Co. General Offices: St. Paul 6, Minn. In Canada: London, Ont., Can. Export: 122 E. 42nd St., New York City. Makers of "Scotch" Pressure-Sensitive Tapes, "Scotch" Sound Recording Tape, "3M" Adhesives, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing.

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☐ *Send me free booklet on grinding of nonferrous metals.*
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(*Continued from page* 172)
Centrifugal Cast Steel Tube." Film was shown through courtesy of American Cast Iron Pipe Co., Birmingham. A casting problem clinic followed the movie.—*George H. Hartwell, Alamo Iron Works.*

Northeastern Ohio

ABOUT 200 members and guests of Northeastern Ohio Chapter of the AFS met Nov. 11 at Tudor Arms Hotel, Cleveland, to hear Walter R. Jaeschke, consulting metallurgical engineer, Whiting Corp., Harvey, Ill., discuss "Cupola Operation." Mr. Jaeschke elaborated on cupola design and operational techniques with emphasis on the control of raw materials and operating conditions necessary for successful operation.—*Kenneth L. Mountain.*

Southern California

ABOUT 135 members and guests of Southern California Chapter of the AFS met Nov. 12 at Rodger Young Auditorium, Los Angeles, to hear T. E. Barlow, sales manager, Eastern Clay Products Dept., International Minerals & Chemical Corp., Chicago, talk on "Pressure Molding."

Several guests representing various technical and educational institutions were introduced. A film, "A Career in Metal," recently purchased by the chapter to strengthen its educational program, was shown following Mr. Barlow's talk.—*W. G. Stenberg, U. S. Electrical Motors Inc.*

Washington

WASHINGTON Chapter of the AFS held its regular technical meeting Nov. 18 at the Poodle Dog Cafe, Tacoma, Wash. Thirty-six members and guests attended to hear T. E. Barlow, sales manager, Eastern Clay Products Dept., International Minerals & Chemical Corp., Chicago, discuss "High-Pressure Molding."—*William K. Gibb, Atlas Foundry & Machine Co.*

Oregon

HIGH-PRESSURE molding was the subject of a talk by T. E. Barlow, sales manager, Eastern Clay Products Dept., International Minerals & Chemical Corp., Chicago, before 80 members of the Oregon Chapter of the AFS, meeting Nov. 17 at the Columbia Athletic Club, Portland, Ore.—*William Walkins, Electric Steel Foundry Co.*

British Columbia

BRITISH Columbia Chapter of the AFS met Nov. 19 at Vancouver Vocational Institute, Vancouver, B. C., to hear T. E. Barlow, sales manager, Eastern Clay Products Dept., International Minerals & Chemical Corp., Chicago, talk on "Pressure Molding." —*J. T. Hornby, Balfour, Guthrie (Canada) Ltd.*

Chicago

FOUR roundtables provided the program for 235 members and guests of Chicago Chapter of the AFS at the Chicago Bar Association, Dec. 6. About 15 students from Navy Pier Branch, University of Illinois, were guests.

W. W. Levi, chief metallurgist, Lynchburg Foundry Co., Radford, Va., addressed the gray iron session on "Basic Cupola Operation." Steel and Malleable Divisions joined to hear Clyde Wyman and Charles A. Faist, chief metallurgist and research metallurgist, respectively, Burnside Steel Foundry Co., present a "Summary Report of the AFS Hot Tear Project."

Pattern and Nonferrous Divisions heard Wayne A. Wright, Woodruff & Edwards Co., discuss "Patterns for

(*Concluded on page* 177)

An IDEAL MACHINE for —

CLEANING CASTINGS • GRINDING AND BLENDING OF WELDS

A machine designed to fill the needs between the portable and heavy-duty swing frame grinders, with extreme maneuverability and ample power to use the large and heavier cup type wheels.

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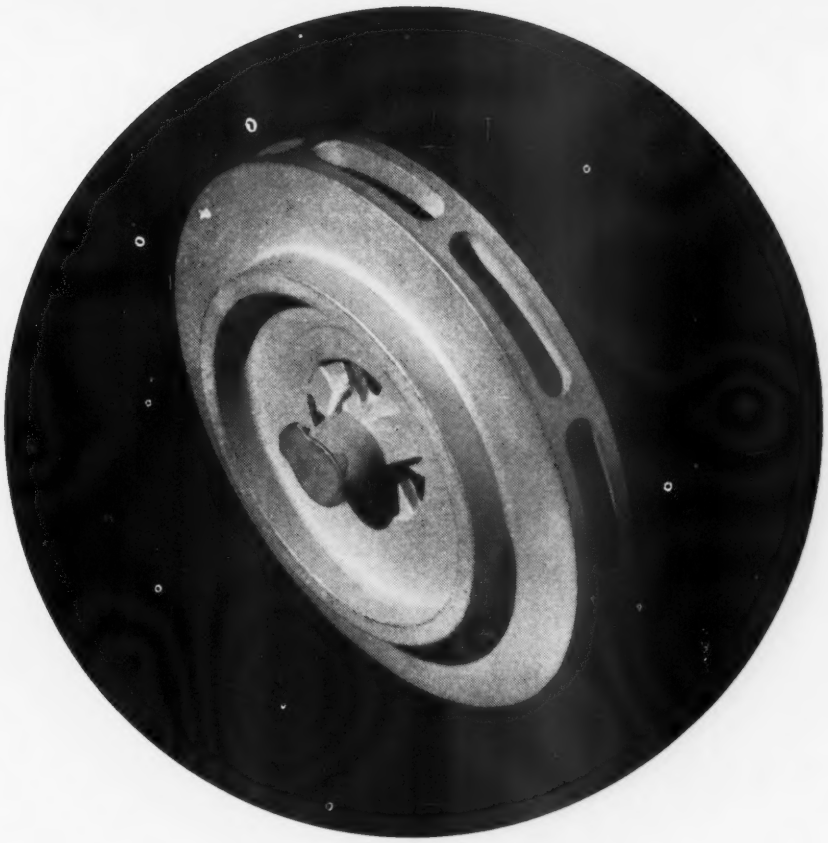
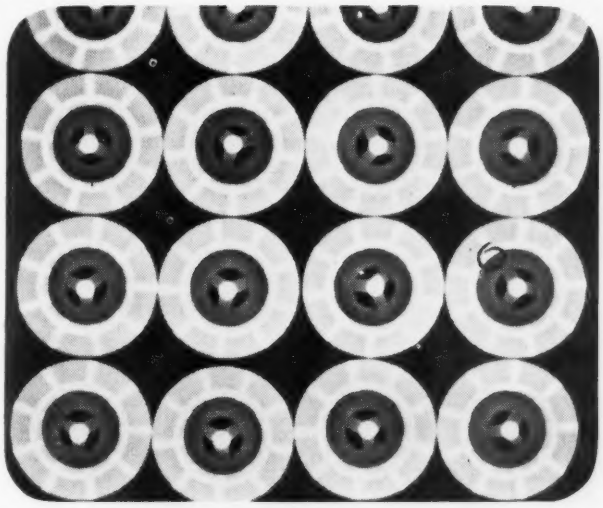


SPINS LIKE "BLAZES"—

so Radiography checks each one



Radiograph of oil scavenger rotor in variable displacement pump for aircraft hydraulic systems.

"BLAZES" is not the word—but suggests the maker's shorter expression for the rate at which this rotor spins. Fact is, rpms are so high that the soundness of the casting is important in terms of safety as well as serviceability.

So radiography goes to work and plays its unique part. With no damage to the product, radiography looks inside the part and checks each rotor's structure. Only flawless parts will meet the strict requirements of service.

Proving soundness with x-rays has become common practice with more and more suppliers of quality castings. They know it helps build reputations for delivering only good work.

If you'd like details on how radiography can improve your operations, get in touch with your x-ray dealer—or write us for a free copy of "Radiography as a Foundry Tool."

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another important example of Photography at Work

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BIG CASTINGS

This is the biggest steel casting ever shipped by rail.

OR LITTLE ONES

. . . EITHER WAY, YOU WILL NEED UNITED'S CORE OIL FOR THE BEST RESULTS!

Our specialized service for core room work has developed a group of United core binders tailor-made to fit each problem job. Your work may be different from the two extremes illustrated above, but if your castings weigh less than 80 tons or more than 1/3 of an ounce, then we have the answer.

From steel to magnesium the right binder is ready and it has been processed to suit your baking time. Our latest bulletin on United core binders is a good one. Write us for your copy.

UNITED OIL MFG. CO.

1429 WALNUT STREET · ERIE, PA.

The large steel runner shown above cleared the rails by six inches when loaded. It was slung between two cars and a thin section was trimmed from the big ring to clear bridges. It moved on a special train with speed limited to 15 miles per hour and travel held to daylight hours only.

(*Concluded from page* 174)

Shell Molding." E. E. Ballard, chief engineer, Lester B. Knight & Associates Inc., spoke on "Scheduling Preventive Maintenance" before the Maintenance Division.—*Erle F. Ross.*

Eastern New York

MORE than 60 members and guests of Eastern New York Chapter of the AFS met in November at Panetta's Restaurant, Menands, N. Y., to hear Frank G. Steinebach, editor, FOUNDRY, talk on "Can We Sell More Castings?" Speaker reviewed developments in the industry since 1900 and outlined advances made in equipment, techniques, metallurgy and new processes.

Mr. Steinebach stated that more castings can be sold if more attention is paid to production, research, pricing, selling and promotion. To survive, foundries must use machines effectively, minimize down time, use preventive maintenance, train better foremen, standardize procedures and hire more engineers. Foundrymen should promote the industry by frequent and regular contacts with high schools, trade schools and engineering schools.—*L. J. DiNuzzo, General Electric Co.*

Detroit

A PANEL discussion on old and new molding methods featured the Oct. 21 meeting of Detroit Chapter of the AFS at the Detroit-Leland Hotel, Detroit. Panel members and their subjects were: M. Warchol, Atlas Foundry Co., "Conventional Molding Machines;" Charles Carolin, R. B. Carolin Foundry & Machine Co., "Shell Molding Practice;" Russell Taccone, Taccone Pneumatic Machine Co., "Diaphragm Molding Equipment," and David Shanon, Somerville Iron Works, "Diaphragm Molding Process and Practice."—*Jess Toth, Harry W. Dietert Co.*

Michigan State

FOUNDRY Educational Foundation Advisory Committee of Michigan State College, East Lansing, Mich., met Nov. 4 at Kellogg Center on the campus. Highlight of the meeting was the presentation by Robert Dodge, Archer-Daniels-Midland Co., Detroit, of a check for $2000 as his company's annual contribution to the Foundation's program. The check brought Archer-Daniels-Midland's support of the industry's educational program to a total of $16,000.

Three recent graduates of Michigan State appeared before the committee to relate their experiences in industry. They were: Kenneth Spray, Experimental Division, Central Foundry Division, General Motors Corp., Saginaw, Mich.; Fred Hodgson, Eaton Mfg. Co., Vassar, Mich., and Richard Dobbins, Albion Malleable Iron Co.

EASTERN NEW YORK Chapter of the AFS met in November at Menands, N. Y. to hear Frank G. Steinebach, editor, FOUNDRY, above, speak on "Can We Sell More Castings?" Photograph by courtesy of General Electric Co.

David Boyd, Engineering Castings Inc., Marshall, Mich., was elected chairman of the advisory committee for 1954-55.

Student Chapter of the AFS held its first meeting of the new season on Nov. 9 to formulate plans for a membership drive and other activities. —*Jack Goldberg and C. C. Sigerfoos, Michigan State College.*

Western Michigan

FINGERS Restaurant, Grand Rapids, Mich., was the scene of the Nov. 8 meeting of Western Michigan Chapter of the AFS, with 110 members and guests attending. E. T. Kindt, Kindt-Collins Co., Cleveland, presented an illustrated talk on "Pattern Engineering." His talk revealed that industrial production has its start in the patternshop and that the patternmaker is a highly skilled craftsman. He also presented an evaluation of the development of pattern materials and finishes.—*W. W. Hicks, Sealed Power Corp.*

Chesapeake

TWO color films featured the Nov. 26 meeting of Chesapeake Chapter of the AFS at the Engineers Club, Baltimore. About 65 members and guests attended. American Foundrymen's Society film, "Effect of Gating on Casting Quality," portrayed, by use of a transparent mold, the advantages of proper gating. American Zinc Institute's film, "How Else Would You Make It," was devoted to the latest developments in die casting.—*Henry M. Witmyer, Foundry Service & Supply Co.*

Tennessee

SIXTY-THREE members and guests of Tennessee Chapter of the AFS met at Hotel Patton, Chattanooga, Tenn., on Nov. 19 to hear Walter R. Jaeschke, consulting metallurgical engineer, Whiting Corp., Harvey, Ill., speak on "Cupola Operation." Charles S. Chisholm, Wheland Co., chapter chairman, presided.—*W. F. Hetzler, Eureka Foundry Co.*

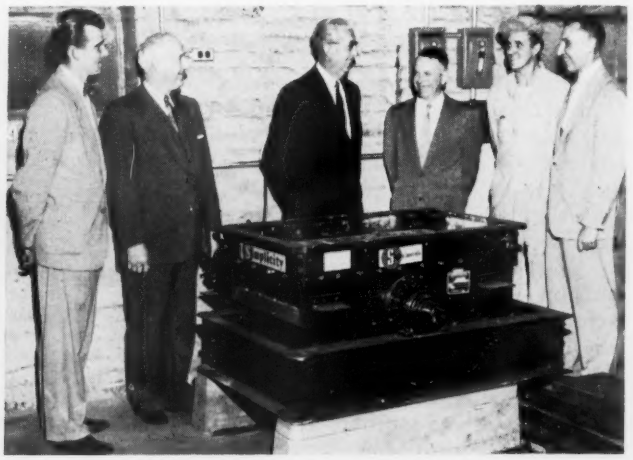
Reading

A DISCUSSION of the use of insulating materials in ferrous and nonferrous casting was the subject of Michael Bock II, vice president, Exomet Inc., Conneaut, O., at the Nov. 16 meeting of the Reading Foundrymen's Association at Berkshire Hotel, Reading.—*W. I. Cassidy*

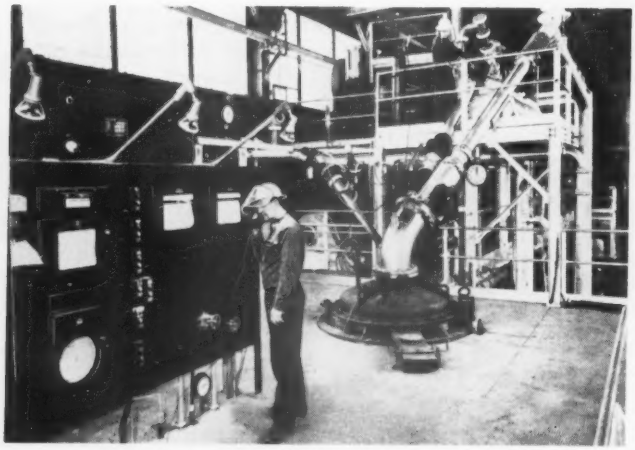
FOUNDRY EDUCATIONAL FOUNDATION Advisory Committee at Michigan State College, East Lansing, Mich., met in November. The committee and guests are pictured above. Standing, left to right, are Kenneth Spray, Central Foundry Division, General Motors Corp.; Richard Dobbins, Albion Malleable Iron Co.; Dr. Robert Thomson, Research Laboratory, GMC; James McDonald, Saginaw Malleable Iron Plant, GMC; Paul Olson, Eaton Mfg. Co.; Kenneth Priestley, Vassar Electroloy Inc.; Robert Dodge, Archer-Daniels-Midland Co.; D. Triponi, Mechanical Engineering Dept., Michigan State College, and Fred Hodgson, Eaton Mfg. Co. Seated, left to right, are H. Charles Esgar, FEF; Dave Boyd, Engineering Castings Inc.; John Smith, Chevrolet Gray Iron Foundry, GMC; C. C. Sigerfoos and Frank Flory, both of the Mechanical Engineering Dept., MSC, and William Ferrell, Auto Specialties Co. Michigan State College photo.

NEWS VIEWS

RETIRES: In appreciation of his 35 years of service, E. H. Nielsen, right above, was honored, on his retirement recently, with a handsome testimonial scroll which was presented to him by S. H. Hammond, chairman of the board, Whiting Corp., Harvey, Ill., left above. A group of friends at Whiting also honored him with a dinner and presented him with a check and scroll as a token of their esteem and friendship. Mr. Nielsen, although retired, will continue to be available for special assignments and is scheduled for a business trip abroad next year to supervise equipment installation and operation. He has served Whiting as an installation and operating engineer



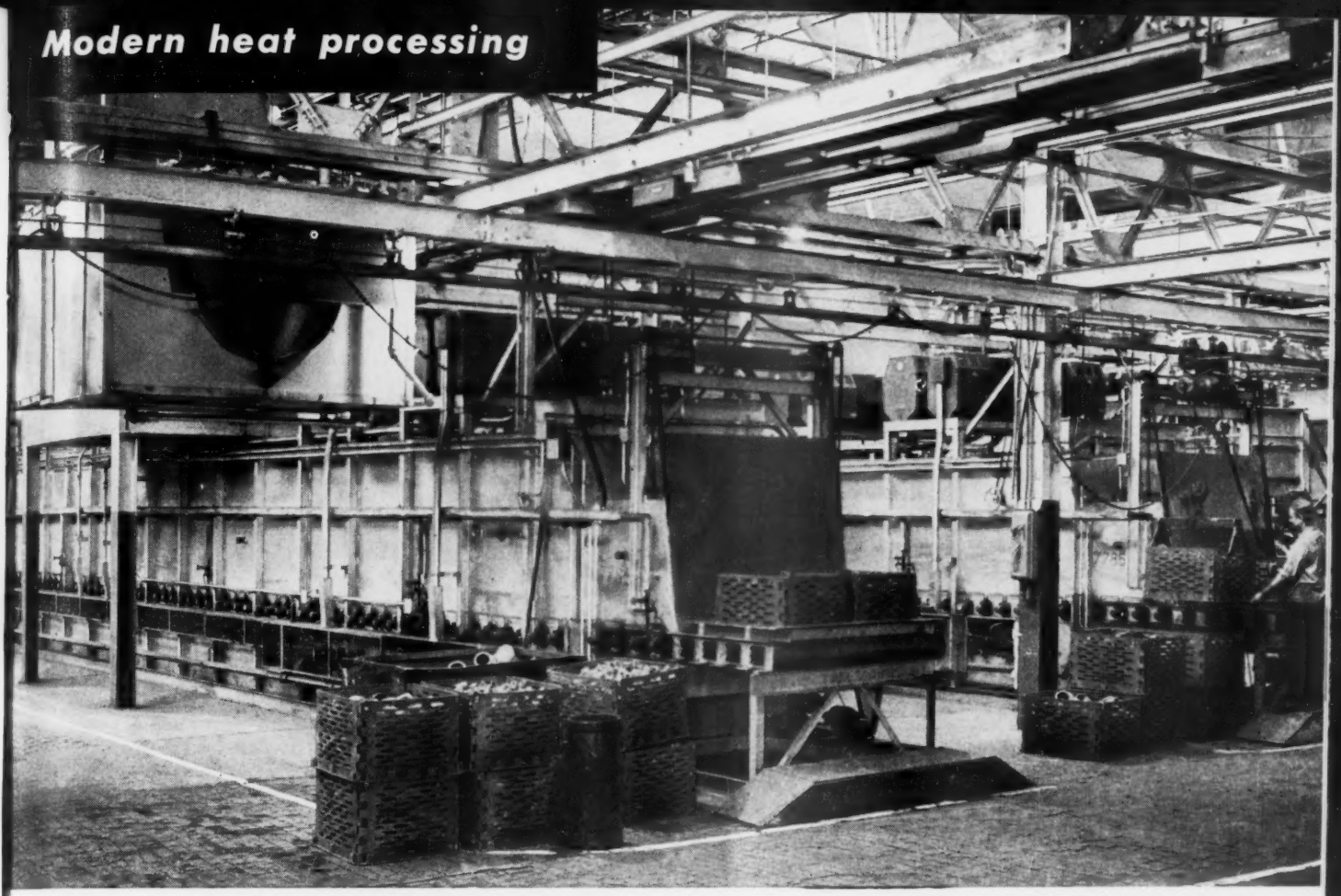
NEW EQUIPMENT: Simplicity Engineering Co., Durand, Mich., recently donated a shakeout machine and an oscillating sand conveyor to Michigan State College for use in its foundry for instruction of engineering students. At the presentation, left to right, are Claridon Thomas, chairman, AFS student chapter; George Kehnke, president, and Russell Westcott, chief engineer, respectively, Simplicity Engineering Co.; Prof. L. G. Price, head, Mechanical Engineering Dept.; Folke Landstrom, technician, and Prof. C. C. Sigerfoos, Mechanical Engineering Dept.



TITANIUM PROCESS: A new process for production of titanium, developed by Union Carbide & Carbon Corp., is shown above in operation on a pilot plant scale in the corporation's Niagara Falls, N. Y., Metal Research Laboratories. Process involves sodium reduction of titanium tetrachloride and is claimed to produce metal of exceptional quality. The process will be launched commercially in a new $31½ million plant at Ashtabula, O., which will produce at least 7500 tons of metal a year. All titanium not bought by private industry will go to the government

DEALER OPEN HOUSE: About 60 representatives of Calhoun and Jackson County (Mich.) automobile dealerships recently visited Albion Malleable Iron Co., Albion, Mich., to see castings for 1955 models being molded, poured and heat treated. It is thought to be the first such visitation staged by an automotive supplier and provided the dealers with a chance to inspect at close range the beginning processes of the final product which they sell. After the tour, a movie "Malleable Metals" was shown. A discussion of the mechanical and physical properties of the castings in the various automobiles followed. Above, guide Jack Turnbull discusses a process with two dealers

Modern heat processing



MODERN MALLEABLE-IRON ANNEALING at its best is achieved in these G-E roller-hearth furnaces. Automatically controlled, both are easily operated by two men. Over 32 tons of low-cost, high-quality castings are processed in these furnaces every day.

Crane Co. Reduces Annealing Cycle 50%, Cuts Man-hours 40% with G-E Furnaces

Replaces Oil-fired Furnaces To Speed Production, Cut Costs

"We've shortened annealing cycles from 4 days to 48 hours, cut man-hours 40%, and sharply reduced maintenance costs by changing to G-E continuous furnaces for annealing malleable iron," says Harry Maack, Chief Metallurgist, Crane Co., Chicago.

With their old oil-burning furnaces, Crane had long annealing cycles and comparatively low production rates. Now, with their new system—including two G-E roller-hearth furnaces and control equipment—they process over 32 tons of castings every 24 hours.

G-E furnaces don't require expensive annealing pots as do fuel-fired furnaces because electric heat preserves the protective atmosphere given off by the castings. Simple, low-cost baskets are all that is needed. This reduces handling time and gives fast, uniform heating of castings. Straight-line, continuous annealing means that no time is wasted in waiting for the furnace to heat up or cool off as was necessary under the old system.

Crane's clean annealing setup has eliminated the discomfort of fumes, dust, and radiant heat. Low maintenance is assured because with durable G-E equipment, there are no products of combustion to cause furnace corrosion.

These extensive savings show how modern electric heat has revolutionized the malleable-iron industry. The first step in applying these benefits to your operation is to contact your nearest G-E Apparatus Sales representative.

GENERAL ELECTRIC

WRITE NOW FOR THESE MODERN HEAT PROCESSING BULLETINS

Annealing Malleable Iron, GEA-5797 | **Furnace and Induction Brazing, GEA-5889** | **Heat Treating of Aluminum, GEA-5912**
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Address: General Electric Co., Sect. 720-120, Schenectady 5, N. Y.

T & O Committee members, left to right, rear: F. B. Barclay Jr., General Steel Castings Corp.; I. W. Sharp, American Steel Foundries; B. G. Emmett, Los Angeles Steel Casting Co.; C. F. Haertel, Falk Corp.; Robert Bedford, American Cast Iron Pipe Co.; and F. P. Murschel, Farrell-Cheek Steel Co. Left to right, in front: A. J. Kiesler, General Electric Co.; R. C. Wood, Minneapolis Electric Steel Castings Co., chairman; C. W. Briggs, Steel Founders' Society of America; R. L. Gilmore, Superior Steel & Malleable Castings Co.

Technical and Operating Practices Discussed at Steel Founders Meeting

CONSTRUCTION of molding sands for steel castings was the outstanding topic at the ninth annual Technical and Operating Conference of the Steel Founders' Society of America, held in Cleveland, Nov. 3-5. The spread of interest among the various sessions was very close, however, in the final rating.

R. C. Wood, president, Minneapolis Electric Steel Castings Co., Minneapolis, presided at the conference as chairman of the national Technical and Operating Committee of the society, which developed the program. The T & O conference is one of the chief activities of the Steel Founders' Society and is supervised by C. W. Briggs, technical and research director.

The session on **Construction of Molding Sands for Steel Castings** featured the simplification of molding practice and the improvement of casting finish through closer sand control. Sand mixture fundamentals for large castings also were covered, and considerable data relating to the use of dry and wet reclaimed sand in both core and molding mixes completed the presentation. Chairman was F. P. Murschel, Farrell-Cheek Steel Co., Sandusky, O., who was assisted by J. H. Janssen, Pratt & Letchworth Co., Buffalo.

Steel Molding Processes reported progress within the industry on both shell and ceramic molds for low-carbon steel castings. Zircon sands for either small or large castings were reported to be finding increased use in the industry. Chilling of steel castings through the use of moldable materials revealed the practical application of research and technical data previously published in the industry. C. F. Haertel, Falk Corp., Milwaukee, presided over the meeting and was assisted by A. J. Kiesler, General Electric Research Laboratory, Schenectady, N. Y.

A four-part session on **Heat Treating in the Steel Foundry** revealed new techniques which developed more accurate results and better properties in low-carbon steel castings. Heat treating cycles, continuous heat treat and improved variations of standard heat treating practices resulting in several quality and strength improvements were established as commercially sound practice with modified heat treating equipment. I. W. Sharp, American Steel Foundries, Verona, Pa., presided over the meeting and was assisted by A. Finlayson, Pacific Car & Foundry Co., Renton, Wash.

Robert Bedford, American Cast Iron Pipe Co., Birmingham, and B. G. Emmett, Los Angeles Steel Casting Co., Los Angeles, presided over the session on **Noise, Smoke and Dust Control.** Discussion included disposal of waste from wet sand reclamation systems, smog control in the foundry, the general topic of noise elimination in foundry operations and a dramatic presentation of the possibilities of reducing noise by eliminating chipping hammers.

Chairmen and speakers at session on heat treating

Chairmen and speakers at session on noise and dirt control

Chairmen and speakers at session on molding sands

Chairmen and speakers at session on molding processes

For the first time in the T & O conference series, a full session was devoted to **Gimmicks, Gadgets and Processes,** presided over by Frank B. Barclay, Jr., General Steel Castings Corp., Granite City, Ill., with A. J. Kiesler as assistant chairman. Thirty-three separate items were covered, varying from practical gimmicks functioning as time savers in production to several items in the quality control field. Topics included devices to prevent chute wear, charging of electric furnaces with fork lift trucks, zircon ladle practice, a core rod and chisel remover, ramoff preventing devices, use of offset trunnions, use of a sandblast device for cleaning clogged vents in core boxes and a method for checking clay buildup on sand grains by screen analysis.

The conference was attended by 478 men from the technical and operating staffs of member companies. Plans for the tenth annual conference were launched immediately.

Chairmen and speakers at session on "Gimmicks, Gadgets and Processes"

TACCONE DIAFORM MOLDING MACHINE

makes available now to every foundry

☆ High Pressure Molding

☆ High Speed Operation

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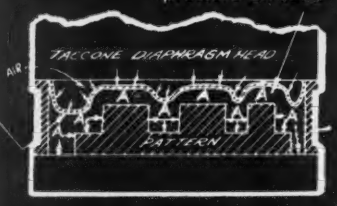
TACCONE PRINCIPLE

Pressure surface of diaphragm on sand is approx. 40% greater than the area of the flask

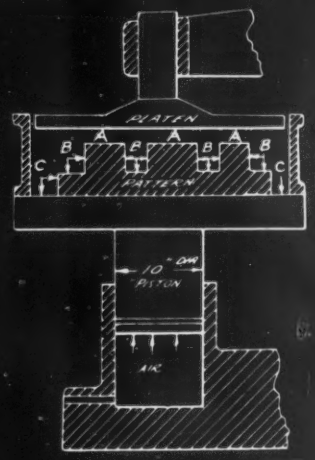
Flask size = 12" x 18"
Area = 216 sq. in.
216 + 40% = 302 sq. in.
302 sq. in. x 80# line pressure = 24,160#

24,160 pounds total pressure on sand



A—DENSITY OF RAM ESSENTIALLY IDENTICAL AT ALL POINTS

80 LB. LINE PRESSURE



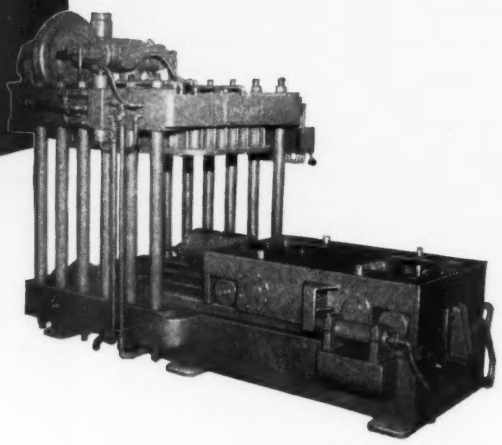
CONVENTIONAL SQUEEZE

A—HARD RAM
B—MEDIUM RAM
C—SOFT RAM

6,280 pounds total pressure on sand

Area of 10" dia squeeze piston = 78.5 sq. inches. 78.5 x 80 = line pressure = 6,280#

HIGH PRESSURE MOLDING
PRECISION CASTINGS
LOWER PATTERN COST
FASTER MOLDING
LESS FLASK MAINTENANCE
MOLD HARDNESS CONTROL
UNIFORM MOLD HARDNESS
LOWER COST MOLDING
LESS AIR CONSUMPTION



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is a must

a must for...

maximum efficiency with diaform molding

a must for...

economy,
smooth finish, precision castings,
easy molding, casting tolerance,
high pressure molding, fast cleaning,
versatile molding, minimum rejects,
maximum production

Flowable sand must be combined with the strength, toughness and workability needed for *your* job. You can get it—by selecting from the eight different bonds and additives developed and manufactured by Eastern Clay. *Only* Eastern Clay produces a complete range of additives for flowability of sand. You can depend on our sand specialists for impartial recommendations . . . and for the correct additives for your particular applications. An Eastern Clay sand specialist will call promptly at your request.

We have a supply of reprints of the complete "Symposium on Sand Practices" published in the November issue of FOUNDRY and invite you to write us for a complimentary copy.

EASTERN CLAY PRODUCTS DEPT.—INTERNATIONAL MINERALS & CHEMICAL CORPORATION

ELECTRIC STEEL FURNACE MEETING

In Pittsburgh Hits All-time Record Attendance

By EDWIN BREMER
Metallurgical Editor

TWELFTH annual Electric Furnace Steel Conference held at William Penn Hotel, Pittsburgh on Dec. 1-3 reached an all-time high in attendance with nearly 850 present.

At the opening session C. F. Staley, Armco Steel Corp., Middletown, O., welcomed those present, and Floyd O. Lemmon, Ohio Steel Foundry Co., Springfield, O., responded. He announced that Mr. Staley had been elected chairman of the Electric Furnace Steel Committee for the ensuing year, and that Clarence E. Sims, Battelle Memorial Institute, Columbus, O., and D. L. Clark, Simonds Saw & Steel Co., Lockport, N. Y., had been elected chairman and vice chairman, respectively, of the committee for the 1955 conference to be held in Pittsburgh on Dec. 7-9. The 1956 conference will be held in Chicago on Dec. 5-7.

At the annual dinner Mr. Lemmon and R. K. Kulp, Electro Metallurgical Co., Pittsburgh, were presented certificates and clocks in recognition of their outstanding services. Speaker at the dinner was Pressly H. McCance, Duquesne Light Co., Pittsburgh, whose topic was "Power and Steel." He mentioned that his firm is engaged in development of a plant for production of electric power from atomic energy, stating that one pound of uranium worth $20 has the same potential as 1500 tons of coal worth $7000.

Opening technical session was devoted to a discussion of vacuum melting. Papers were by J. H. Moore, Vacuum Metals Corp., Cambridge, Mass.; R. K. McKechnie, General Electric Co., Schenectady, N. Y.; E. M. Mahla, E. I. du Pont de Nemours & Co., Newport, Del., and H. H. Scholefield, Telegraph Construction & Maintenance Co., London, England. The speakers said that vacuum-melted steels are free from gases and inclusions, and have much better physical properties than the usual commercial products. Vacuum melting also is employed to make certain alloys which cannot be produced by common melting methods.

Second session dealt with basic and acid melting practice for low and high alloy cast steels. A. F. Gross, Ohio Steel Foundry Co., Springfield, O., described in detail basic practice for quality steel as followed by his firm. Briefly, the furnaces carry a burden of 5 to 6½ tons and metal is melted as rapidly as possible. Time is about one hour, and meltdown carbon for alloy heats is about 0.40 per cent above tapping range while for carbon steels it is about 0.20 per cent. Heats then are blown with oxygen to bring carbon to the desired level.

Temperature is determined by immersion thermocouples, and the slag is held back during tapping. This is accomplished by plugging the taphole with rags and tilting the furnace rapidly. Ferrosilicon or zirconium-silicon and calcium-silicon are added to the stream, followed by plunging aluminum beneath the slag-free metal.

CLARENCE E. SIMS
1955 Conference Chairman

In a review of acid steelmaking practice, C. C. Wissmann, Los Angeles Steel Castings Co., Los Angeles, confined his discussion to the aspects of oxidation. He concluded that oxidation is beneficial to steel, particularly if carried out before the boil or during meltdown. However, present knowledge does not answer the problem of how much oxidation is required.

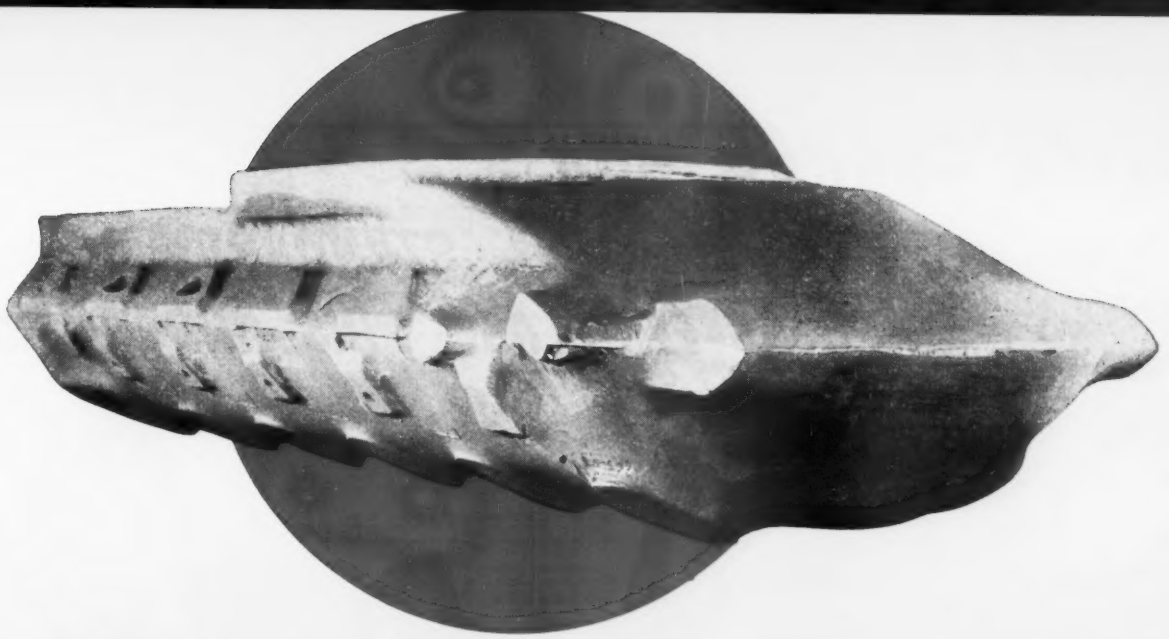
Harold C. Templeton, Lebanon Steel Foundry, Lebanon, Pa., described "High-alloy Steel Melting in the Basic Arc Furnace." Normal heats of 8000 to 8500 lb are melted under single slag practice with reduction of the carbon by gaseous oxygen. Chromium recovery from slag is obtained after the blow by addition of 85 per cent ferrosilicon with lime to provide proper slag basicity. Final additions of low-carbon ferrochrome are made after the slag has been reduced to obtain the desired composition.

P. R. Gouwens, Fahralloy Co., Harvey, Ill., gave information on three procedures for melting high-alloy steels. These included acid dead melting, acid oxygen, and modified basic oxygen. All of the three practices were conducted in one furnace melting 1200-lb charges. Results obtained indicated that the modified oxygen basic method provides the best over-all economy. It permits greater recovery of alloys as well as use of low-cost ferroalloys; also more metal can be tapped from the furnace with a given size charge than with acid practice.

Third session was concerned with foundry melting, and dealt with use of high-alumina brick, furnace control, and ladle practice for acid and basic steel. V. E. Belusko, Electric Steel Foundry, Portland, Oreg., described the use of high-alumina brick in single-slag basic practice producing a wide variety of alloy steels. High-alumina brick containing 70 to 80 per cent alumina used in the roof gave over 500 heats with repair of the center section at 275 heats. High cost of such brick was offset by the increased life of the roof. The author pointed out that the practice of increasing the rise in roof curvature to 1¾-in. per ft aided in increasing the life.

Joseph Seymour, Kensington Steel Co., Kensington, Ill., discussed operational experience with an air-counterbalanced hydraulic differential electrode control developed by Whiting Corp., Harvey, Ill., Description of this device was presented on page 256 of the October, 1954 issue of FOUNDRY. Use of the control gives lower transformer temperature, a decrease of 10 to 15 per cent in refractory cost, a reduction of 5 to 6 per cent in power consumption, and a decrease in melting time from tap to tap.

Previous to discussion of ladle practice S. E. McGinty, Firegan Sales Co., Chicago, presented a motion picture, "Quarrying Operation for Ganister Production," which showed the numerous steps involved in preparing siliceous material suitable for furnace linings. Brief descriptions of practices in lining of ladles for acid practice were given by Wilfred Luvusi, Bonney-Floyd Co., Columbus, O., and G. R. McDaniel and R. S. Haught, Sawbrook Steel Castings Co., Lockland, O. Ladle lining practice for basic steel was discussed by K. T. Apgar, Taylor-Wharton Iron & Steel Co., High Bridge, N. J., and R. H. Lewis, Allegheny-Ludlum Steel Corp., Buffalo.



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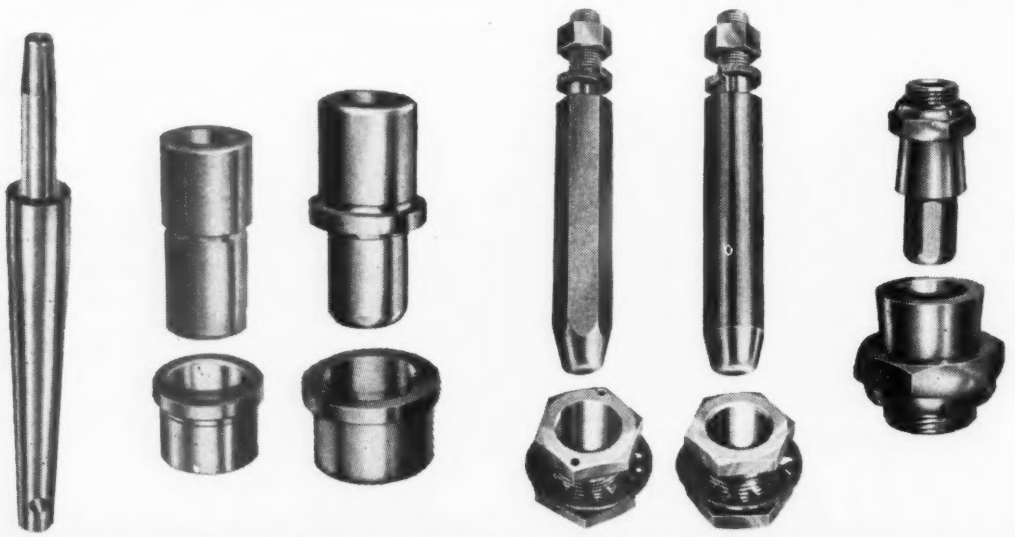
QUICK CHANGE WITH UNIVERSAL STANDARD PRESS-FIT FLASK PINS AND BUSHINGS

To compensate for wear in the ear holes of cope and drag, standard size Universal Press-Fit Flask Pins and Bushings are available with three different outside diameters, the second slightly larger than the original size and the third slightly larger than the second. Thus, as the ear holes increase in size—and replacement of the original pins and bushings becomes necessary—pins and bushings with a larger outside diameter are available to provide a good, tight fit in the larger ear holes without welding or other expensive, time-consuming operations. Just drive out the old, press in the new . . . truly "quick change"!

Universal Flask Pins and Bushings of all types are available in a complete range of sizes as regular stock items. Plain, taper, threaded or hexagonal series. For complete information, write to Universal Engineering Sales Co., 1060 Broad St., Newark 2, N. J.; 5035 Sixth Ave., Kenosha, Wis.; or the home office.



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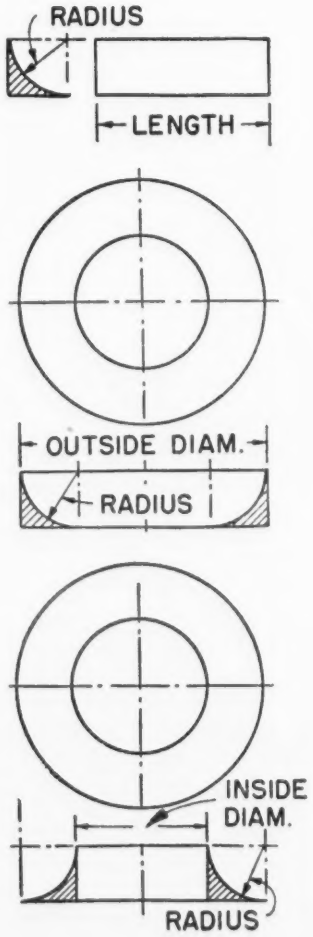
UNIVERSAL ENGINEERING COMPANY FRANKENMUTH 4, MICHIGAN

Determining the Weights of Metal Fillets



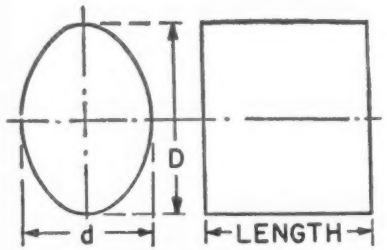
To find the weight in lb of a fillet of any length multiply the weight per inch, obtained from the accompanying table by the length.

To find the weight in lb of an inside circular fillet, first find the circumference of a circle whose diameter is the outside diameter minus 0.45 of the radius. Then the weight required is this circumference multiplied by the weight per inch obtained from the accompanying table.

To find the weight of an outside circular fillet, first find the circumference of a circle whose diameter is the inside diameter plus 0.45 of the radius. Then the weight required is this circumference multiplied by the weight per inch obtained from the accompanying table.

Rad. in inches	Weight of Fillet 1 Inch Long When Cast in: Cast iron	Steel	Aluminum	Copper	Zinc	Gun metal	Yellow brass	Rad. in inches	Weight of Fillet 1 Inch Long When Cast in: Cast iron	Steel	Aluminum	Copper	Zinc	Gun metal	Yellow brass
1/4	.0035	.0038	.0013	.0043	.0034	.0043	.0041	4 5/8	1.20	1.30	.442	1.47	1.16	1.45	1.39
3/8	.0079	.0086	.0029	.0097	.0077	.0095	.0091	4 3/4	1.26	1.37	.467	1.55	1.23	1.53	1.47
1/2	.0140	.0152	.0052	.0172	.0136	.0170	.0163	4 7/8	1.33	1.44	.492	1.63	1.29	1.61	1.55
5/8	.0219	.0238	.0081	.0266	.0222	.0265	.0254								
3/4	.0315	.0342	.0116	.0386	.0307	.0381	.0367	5	1.40	1.52	.516	1.72	1.36	1.70	1.63
7/8	.0440	.0466	.0158	.0526	.0416	.0520	.0498	5 1/8	1.47	1.60	.544	1.80	1.43	1.78	1.71
								5 1/4	1 54	1.63	.568	1.89	1.50	1.87	1.79
1	.0559	.0612	.0207	.0688	.0543	.0679	.0652	5 3/8	1.62	1.76	.598	1.98	1.57	1.96	1.88
1 1/8	.0710	.0772	.0262	.0871	.0688	.0857	.0823	5 1/2	1.70	1.84	.626	2.08	1.64	2.05	1.97
1 1/4	.0876	.0954	.0322	.107	.0850	.106	.102	5 5/8	1.78	1.93	.643	2.17	1.72	2.14	2.06
1 3/8	.106	.115	.0390	.130	.103	.128	.123	5 3/4	1.86	2.02	.682	2.27	1.80	2.24	2.15
1 1/2	.126	.137	.0465	.155	.122	.153	.147	5 7/8	1.94	2.11	.713	2.37	1.83	2.34	2.24
1 5/8	.148	.162	.0545	.181	.143	.179	.172								
1 3/4	.174	.186	.0634	.211	.166	.208	.200	6	2 02	2.20	.742	2.47	1.96	2.44	2.34
1 7/8	.197	.214	.0726	.242	.191	.239	.229	6 1/8	2.10	2.29	.773	2.58	2.04	2.54	2.44
								6 1/4	2.19	2.38	.805	2.68	2.12	2.65	2.54
2	.224	.244	.0826	.274	.217	.271	.260	6 3/8	2.28	2.47	.838	2.79	2.21	2 75	2.65
2 1/8	.253	.276	.0935	.310	.245	.304	.293	6 1/2	2.37	2.57	.874	2.90	2.30	2.86	2.75
2 1/4	.285	.310	.105	.349	.274	.342	.328	6 5/8	2.46	2.67	.906	3.02	2.38	2.97	2.85
2 3/8	.325	.346	.117	.389	.307	.384	.367	6 3/4	2 55	2.78	.942	3.13	2.47	3.08	2.96
2 1/2	.351	.383	.126	.430	.340	.425	.405	6 7/8	2.65	2.89	.975	3.25	2.56	3.20	3.07
2 5/8	.386	.423	.142	.474	.376	.468	.449								
2 3/4	.425	.464	.156	.520	.412	.512	.493	7	2.75	2.99	1.01	3.37	2.66	3.32	3.18
2 7/8	.463	.505	.171	.568	.450	.558	.537	7 1/8	2.84	3.10	1.05	3.50	2.75	3 44	3.29
								7 1/4	2.94	3.21	1.09	3.62	2.85	3.56	3.42
3	.504	.550	.186	.620	.488	.612	.586	7 3/8	3.04	3.32	1.12	3.74	2.96	3.68	3.54
3 1/8	.548	.597	.202	.672	.531	.662	.635	7 1/2	3 15	3.43	1.16	3.86	3.06	3.82	3.66
3 1/4	.592	.645	.218	.726	.573	.715	.687	7 5/8	3.26	3.54	1.20	3.99	3.16	3.94	3.78
3 3/8	.638	.694	.236	.784	.620	.772	.742	7 3/4	3.37	3.66	1.24	4.12	3.26	4.07	3.91
3 1/2	.686	.747	.254	.841	.666	.830	.797	7 7/8	3.48	3.78	1.28	4.26	3.37	4 20	4.08
3 5/8	.737	.800	.272	.905	.715	.890	.855								
3 3/4	.789	.857	.289	.968	.765	.954	.915	8	3.59	3.91	1.32	4.38	3.48	4.34	4.17
3 7/8	.841	.916	.312	1.03	.815	1.02	.977	8 1/8	3.70	4.03	1.36	4.53	3.59	4.48	4.30
								8 1/4	3 82	4.16	1.41	4.68	3.70	4.62	4.43
4	.896	.978	.330	1.10	.868	1.08	1.04	8 3/8	3.93	4.28	1.45	4.81	3.81	4.76	4.57
4 1/8	.944	1.04	.352	1.17	.922	1.15	1.11	8 1/2	4.05	4.40	1.50	4.95	3.92	4.90	4.71
4 1/4	1.01	1.10	.374	1.24	.980	1.22	1.17	8 5/8	4.17	4.53	1.54	5.10	4.04	5 04	4.84
4 3/8	1.07	1.16	.396	1.31	1.04	1.30	1.25	8 3/4	4.29	4.67	1.58	5.26	4.16	5.19	4.98
4 1/2	1.14	1.23	.418	1.39	1.10	1.37	1.32	8 7/8	4.42	4.81	1.63	5.42	4.28	5.34	5.12

Table for Determining the Weights for Elliptical Bars



The accompanying tables give the weights in lb of elliptical bars of cast iron, steel, aluminum, copper, zinc, gun metal and yellow brass in one-inch lengths. To find the weight of an elliptical bar of these materials of any given length, multiply the weight per running inch from the table by the total length of the bar in inches.

		Weight of Bar 1 Inch Long When Cast in:						
d	D	Cast iron	Steel	Aluminum	Copper	Zinc	Gun metal	Yellow brass
¾	1	.153	.167	.057	.188	.149	.186	.178
¾	1¼	.192	.209	.071	.235	.186	.232	.223
¾	1½	.230	.251	.085	.283	.223	.279	.268
¾	1¾	.268	.292	.099	.330	.260	.325	.312
¾	2	.307	.334	.113	.377	.297	.371	.357
¾	2¼	.345	.376	.128	.424	.335	.418	.401
¾	2½	.383	.418	.142	.471	.372	.464	.446
¾	2¾	.422	.460	.156	.518	.409	.511	.491
¾	3	.460	.501	.170	.565	.446	.557	.535
1	1¼	.256	.278	.095	.313	.248	.309	.297
1	1½	.307	.334	.114	.375	.297	.371	.356
1	1¾	.358	.339	.133	.433	.347	.433	.416
1	2	.409	.445	.152	.500	.397	.495	.475
1	2¼	.460	.501	.170	.564	.446	.557	.535
1	2½	.511	.556	.190	.625	.496	.619	.594
1	2¾	.562	.612	.209	.688	.545	.681	.653
1	3	.613	.667	.228	.750	.595	.743	.712
1	3½	.716	.779	.265	.875	.694	.866	.851
1	4	.818	.890	.303	1.00	.793	.990	.950
1¼	1½	.324	.418	.142	.471	.372	.464	.446
1¼	1¾	.448	.487	.166	.548	.434	.542	.519
1¼	2	.512	.556	.190	.625	.496	.619	.594
1¼	2¼	.576	.626	.212	.705	.558	.697	.668
1¼	2½	.640	.694	.236	.784	.620	.774	.742
1¼	2¾	.704	.764	.259	.862	.682	.851	.816
1¼	3	.768	.833	.283	.941	.744	.929	.890

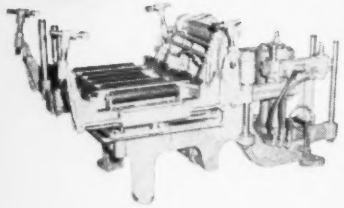
		Weight of Bar 1 Inch Long When Cast in:						
d	D	Cast iron	Steel	Aluminum	Copper	Zinc	Gun metal	Yellow brass
1¼	3½	.896	.971	.331	1.10	.868	1.08	1.04
1¼	4	1.02	1.11	.378	1.25	.992	1.24	1.19
1¼	4½	1.15	1.25	.425	1.41	1.12	1.39	1 34
1¼	5	1.28	1.39	.473	1.57	1.24	1.55	1.48
1½	1¾	.537	.585	.198	.659	.520	.650	.624
1½	2	.613	.667	.227	.753	.595	.743	.713
1½	2¼	.690	.752	.255	.848	.669	.835	.803
1½	2½	.767	.835	.283	.942	.743	.928	.892
1½	2¾	.843	.919	.312	1.04	.818	1.02	.981
1½	3	.920	1.00	.340	1.13	.892	1.11	1.07
1½	3½	1.07	1.17	.397	1.32	1.04	1.30	1.25
1½	4	1.23	1.34	.453	1.51	1.19	1.49	1.43
1½	4½	1.38	1.50	.510	1.69	1.34	1.67	1.61
1½	5	1 53	1.67	.567	1.88	1.49	1.86	1.78
1½	5½	1.69	1.84	.624	2.07	1.63	2.04	1.96
1½	6	1.84	2.01	.681	2.26	1.78	2.23	2.14
2	2½	1.02	1.11	.378	1.25	.992	1 24	1.19
2	3	1.23	1.34	.455	1.51	1.19	1.49	1.43
2	3½	1.43	1.56	.530	1.76	1.39	1.73	1.66
2	4	1 64	1.78	.606	2.01	1.59	1.98	1.90
2	4½	1.84	2.01	.681	2.26	1.78	2.23	2.14
2	5	2.05	2.23	.758	2.51	1.98	2.48	2 38
2	5½	2.25	2.45	.833	2.76	2.18	2 72	2.61
2	6	2.46	2.67	.909	3.01	2.33	2.97	2.85
2	7	2 86	3.12	1.06	3.51	2.78	3.47	3.33
2	8	3.27	3.57	1.21	4.01	3.17	3.96	3.80

		Weight of Bar 1 Inch Long When Cast in:						
d	D	Cast iron	Steel	Aluminum	Copper	Zinc	Gun metal	Yellow brass
2½	3	1.53	1.67	.567	1.88	1.49	1.86	1.78
2½	3½	1.79	1.95	.662	2.19	1.74	2.17	2.08
2½	4	2.05	2.23	.756	2.51	1.98	2.48	2.38
2½	4½	2.30	2.50	.851	2.82	2.23	2.79	2.67
2½	5	2.56	2.78	.955	3.14	2.47	3 10	2.97
2½	5½	2.81	3.06	1.05	3.45	2.72	3.40	3.26
2½	6	3.06	3.34	1.14	3.77	2.97	3.71	3 56
2½	7	3.57	3.90	1.33	4.40	3.47	4.33	4.15
2½	8	4.08	4.45	1.52	5.02	3.97	4 95	4.75
2½	9	4.59	5.01	1.71	5.65	4.46	5.57	5.34
2½	10	5.11	5.56	1.89	6.27	4.96	6.19	5.94
3	3½	2.14	2.34	.797	2.63	2.08	2.60	2.49
3	4	2.46	2.67	.909	3.01	2.33	2 97	2.85
3	4½	2.76	3.01	1.02	3.39	2.68	3.34	3.21
3	5	3.06	3.34	1.13	3.76	2.98	3 71	3.56
3	5½	3.37	3.68	1.25	4.14	3.27	4.03	3.92
3	6	3.63	4.01	1.36	4.52	3.57	4 45	4.28
3	7	4.29	4.68	1.53	5.27	4.16	5.19	4.99
3	8	4.90	5.35	1.81	6.02	4.76	5 93	5.71
3	9	5.52	6.01	2.03	6.77	5.35	6.68	6.42
3	10	6.13	6.68	2.26	7.53	5.95	7.42	7.13
3	11	6.74	7.35	2.49	8.23	6.54	8.16	7.84
3	12	7.36	8.01	2.72	9.03	7.14	8 91	8.55
3½	4	2.86	3.12	1.06	3.51	2.78	3.47	3.33
3½	4½	3.22	3.51	1.19	3.95	3.13	3 91	3.74
3½	5	3.57	3.90	1.33	4.40	3.47	4.33	4.15
3½	5½	3.93	4.29	1.46	4.83	3.81	4 76	4.57
3½	6	4.29	4.69	1.58	5.27	4.16	5.19	4.99
3½	7	5.01	5.47	1.84	6.15	4.86	6 05	5.82
3½	8	5.72	6.24	2.11	7.02	5.55	6.92	6.66
3½	9	6.44	7.01	2.39	7.90	6.25	7.79	7.49
3½	10	7.15	7.78	2.65	8.79	6.94	8.67	8.32
3½	11	7.87	8.56	2.91	9.66	7.64	9 54	9.15
3½	12	8.58	9.34	3.17	10.53	8.33	10.40	9.97

		Weight of Bar 1 Inch Long When Cast in:						
d	D	Cast iron	Steel	Aluminum	Copper	Zinc	Gun metal	Yellow brass
4	4½	3.68	4.01	1.36	4.51	3.57	4 46	4.28
4	5	4.08	4.45	1.52	5.02	3.97	4.95	4.75
4	5½	4.49	4.90	1.67	5.52	4 36	5.44	5.23
4	6	4.90	5.35	1.81	6.02	4.76	5.93	5.71
4	7	5.72	6.24	2.11	7.02	5.55	6 92	6.66
4	8	6.54	7.13	2.42	8.03	6.35	7.92	7.61
4	9	7.36	8.01	2.72	9.03	7.14	8.91	8.55
4	10	8.17	8.89	3.02	10.03	7.94	9.91	9.50
4	11	8.99	9.78	3.33	11.04	8.73	10.90	10.45
4	12	9.81	10 63	3.63	12.04	9.52	11.89	11.40
4½	5	4.59	5.01	1.71	5.65	4.46	5.57	5.34
4½	5½	5.06	5.51	1.83	6.21	4.91	6.12	5.87
4½	6	5.52	6.01	2.05	6.77	5 35	6.68	6.42
4½	7	6.44	7.01	2.33	7.90	6.25	7.79	7.49
4½	8	7.36	8.01	2.72	9.03	7.14	8.91	8.55
4½	9	8.28	9 01	3.06	10.16	8.03	10.02	9.62
4½	10	9.19	10.01	3.40	11.29	8.93	11.14	10.69
4½	11	10.11	11.01	3.74	12.42	9.82	12.25	11.76
4½	12	11.04	12.02	4.03	13.54	10.71	13.37	12.82
5	6	6.13	6.67	2.27	7.53	5.95	7.43	7.13
5	7	7.15	7.78	2.65	8.79	6.94	8.67	8.32
5	8	8.17	8 83	3.02	10.03	7.94	9.91	9.51
5	9	9.19	10.01	3.40	11.29	8.93	11.14	10.69
5	10	10.22	11.12	3.78	12.54	9.92	12.38	11.88
5	11	11.24	12.23	4.16	13.79	10 91	13.62	13.07
5	12	12.27	13.35	4.54	15.05	11.90	14.86	14.25
6	7	8.58	9.34	3.17	10.53	8.33	10.40	9.97
6	8	9.81	10 68	3.63	12.04	9.52	11.89	11.40
6	9	11.04	12.02	4.08	13.54	10.71	13.37	12.82
6	10	12.27	13.35	4.54	15.05	11.90	14.86	14.25
6	11	13.49	14.69	5.00	16.56	13 09	16.34	15.67
6	12	14.72	16.02	5.45	18.07	14.28	17.83	17.10

A COMPLETE CORE OR MOLDING UNIT

TYPE GJR

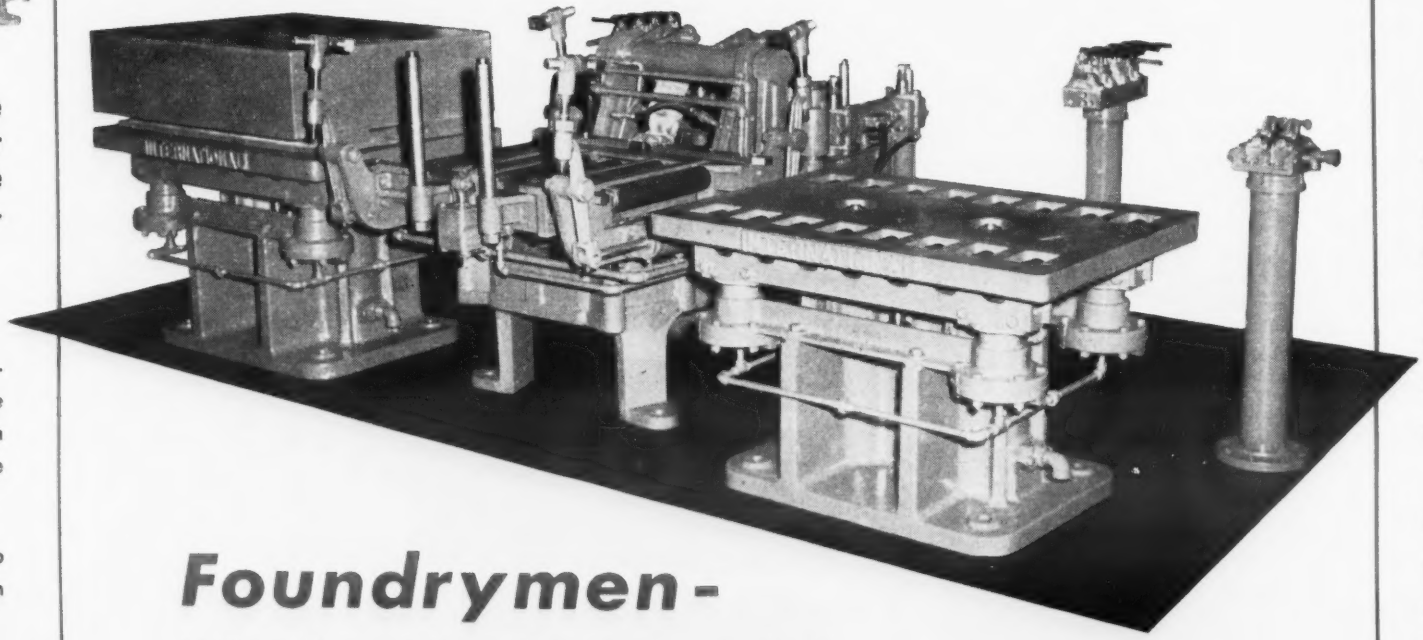


The International Type GJR Air Rollover, Air Draw Molding Machine offers you these outstanding features -

- Accuracy of draw
- Air-Actuated Clamps — for clamping either the core box or the pattern plate to the machine frame
- Air Clamps—to clamp core plates or bottom boards
- Air-Operated Equalizers
- Air Vibrators

"There is an INTERNATIONAL for Every Type of Job"

Combining International Types GJR and JJR Machines



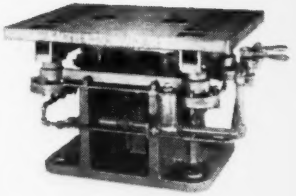
Foundrymen -

Why Not Shuttle Your Jobs?

Ideal for Jobbing and Production Work!

SIZES TO SUIT YOUR REQUIREMENTS

TYPE JJR



The International Type JJR Machines incorporate the DOUBLE JOLT FEATURE and the sturdiness so necessary to give a positive ram throughout the core or mold.

On the JJR Machine, the rollers are an integral part of the machine and are actuated by air cylinders for the ease of loading and unloading, resulting in faster, cheaper operations.

INTERNATIONAL MOLDING MACHINE COMPANY

LA GRANGE PARK, ILLINOIS

The International Line is designed by experienced foundry engineers who have a practical working knowledge of the problems of the industry.

OBITUARY

WILFRED H. WHITE, owner, Watertown Foundry Co., Watertown, S. Dak., died suddenly Dec. 1. Mr. White was graduated from Antioch College in 1929. After 3 years as chemist with E. I. du Pont de Nemours, Buffalo, he joined Jamestown Malleable Iron Corp., Jamestown, N. Y. He was engaged in metallurgical work there until 1942 when he became chief of the Tungsten Section, Ferro-Alloys Branch, WPB, Washington. He was metallurgist, Jackson Iron & Steel Co., Jackson, O., from 1944 until last year when he acquired the Watertown foundry.

* * *

Lawrence L. Anthes, 78, consultant, Anthes-Imperial Co. Ltd., Toronto, Ont., died there Nov. 23. In 1896 Mr. Anthes entered Toronto Foundry Co., Toronto, Ont., where his father was engaged in manufacture of cast iron soil pipe and fittings. Name of the company was changed in 1908 to Anthes Foundry Ltd., and at his father's death in 1914 he became managing director, secretary-treasurer. In 1933 he was named president of the company, which had plants in Toronto and Winnipeg, Manitoba, as well as president, Imperial Iron Corp. Ltd., St. Catharines, Ont. He was also chairman of the board, Anthes-Tait Foundry Ltd., Vancouver, B. C. Mr. Anthes was president of the American Foundrymen's Society in 1909 and in 1935 received the John A. Penton Gold Medal of the society for distinguished service to the foundry industry of America.

* * *

Dr. Richard H. Patch, 66, director and vice president-operations, E. F. Houghton & Co., Philadelphia, died Nov. 13 in Hot Springs, Ark. Dr. Patch was graduated from Harvard University and received his doctor's degree there. He joined the Houghton company in 1926 after 12 years with Midvale Co., Philadelphia. Dr. Patch was also executive vice president, E. F. Houghton & Co. of Canada and treasurer, Houghton Vix-Syn Co., Hopkins, Minn. He was a former president of the Philadelphia Chapter of the American Society for Metals.

* * *

Kirk Logan, 75, special research associate, Cast Iron Pipe Research Association, Washington, died Nov. 14. Mr. Logan received degrees from University of Kansas and Kansas State College. He joined the National Bureau of Standards in 1911 and in 1926 became chief of the underground corrosion section. He had been with the pipe research association since being retired from the government in 1946.

* * *

Raymond Hunter, 59, since 1929 New England district manager, Archer-Daniels-Midland Co., Cleveland, and Sterling Wheelbarrow Co., Milwaukee, died suddenly Nov. 17. He was previously representative in New England for Clarence White Metals Co.

* * *

William F. Hoffman, 73, until his retirement 5 years ago, secretary-treasurer, Chicago Malleable Castings Co., Chicago, died Nov. 8. He was previously associated with the former Northwestern Malleable Iron Co., Chicago.

* * *

Edward Wehr, 72, chairman of the board of directors, Wehr Steel Co., Milwaukee, died Nov. 27. Mr. Wehr was one of the founders of the company, organized in 1910.

* * *

James E. Brown, 73, former assistant to the vice president of sales, Rockwell Mfg. Co., Pittsburgh, died

(*Concluded on page* 193)

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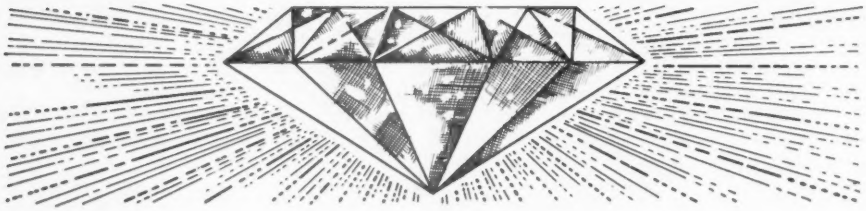

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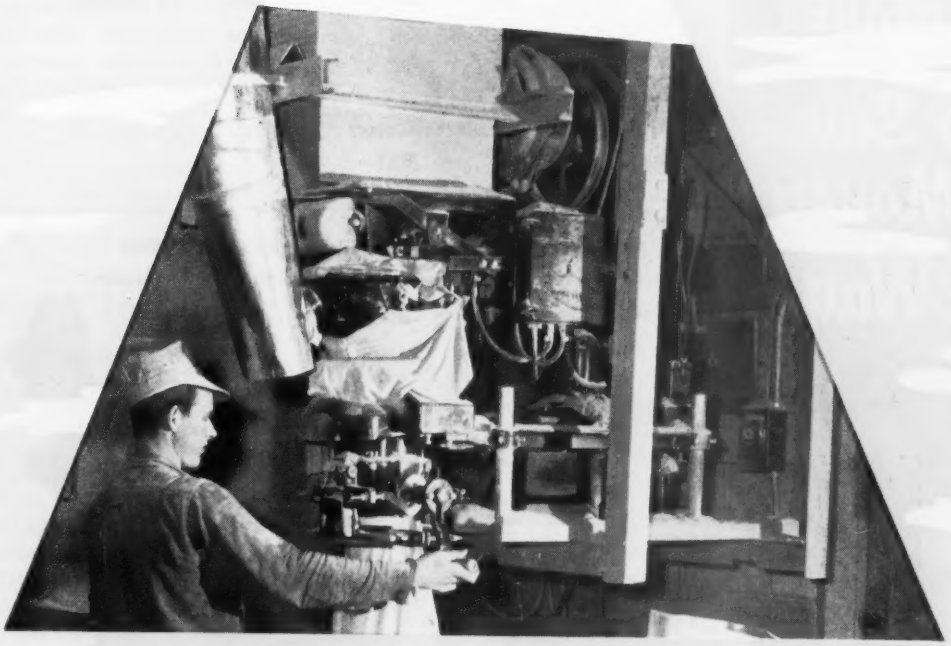

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(*Concluded from page* 190)

Nov. 15 in Culver City, Calif., where he had lived since his retirement 5 years ago.

* * *

Roy W. Wilson 60, founder and president, Advance Aluminum Castings Corp., Chicago, died there Nov. 29.

* * *

John T. Harwood, 57, assistant purchasing agent, Link-Belt Co., Chicago, died Dec. 6.

NYU Schedules Course On Air Pollution

New York University is offering, for the second year, a course in air pollution. This year's course, scheduled from Feb. 10 through May 26 will meet once a week for 15 weeks. The course is designed to acquaint persons interested in air pollution control with the fundamentals of measurement and prevention of atmospheric pollution. Application should be made through the Office of the Dean, New York University Post-Graduate Medical School, 550 First Ave., New York 16. Tuition is $60.

Methods Engineering Is Training Subject

Special training in process analysis, operation analysis, motion study, work measurement, plant layout, and selling and installing new methods is offered in a training program in methods engineering given by Methods Engineering Council, 718 Wallace Ave., Pittsburgh 21. The three-week program begins Jan. 10 and closes Jan. 28. All costs for the training program are included in a $325 fee.

Book Review

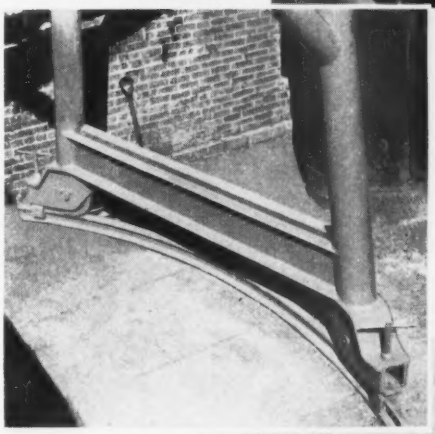
Manual on Industrial Water, 1954 Printing, cloth, 420 pages, 6 x 9 in., published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3. Price $5.

New test methods, revisions of existing methods, complete table of contents and a detailed index are features of the second printing of this manual. It offers a broad discussion on the nature and uses of industrial water. It is intended as an authoritative reference source of information for executives and plant designers, individuals engaged in industrial operations involving the use of water, and analysts, operators of special instruments, engineers and consultants.

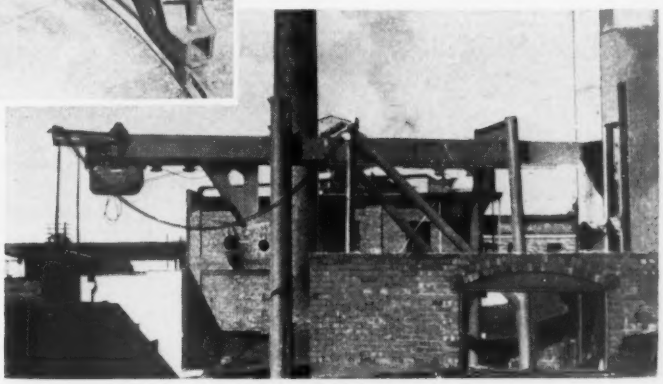
Entirely new method of

CUPOLA CHARGING

loads MORE and FASTER with LESS HELP



Three views of the Columbiana Automatic Cupola Charger: Top shows close-up of machine; left shows its mobile base; bottom shows complete setup.



The Columbiana Automatic Cupola Charger shown is capable of placing 1000-lb. charges every 1½ minutes. The machine is entirely automatic, but its movements may be controlled by an operator. Services of only two men are required for weighing and placing the charge in the charging bucket. A single control button starts the automatic cycle that lifts the load vertically 25 feet, then carries it horizontally into the cupola, where the bucket is lowered and discharged, after which it returns automatically. This machine is entirely new, but the manufacturers have several sizes available. Call or write:

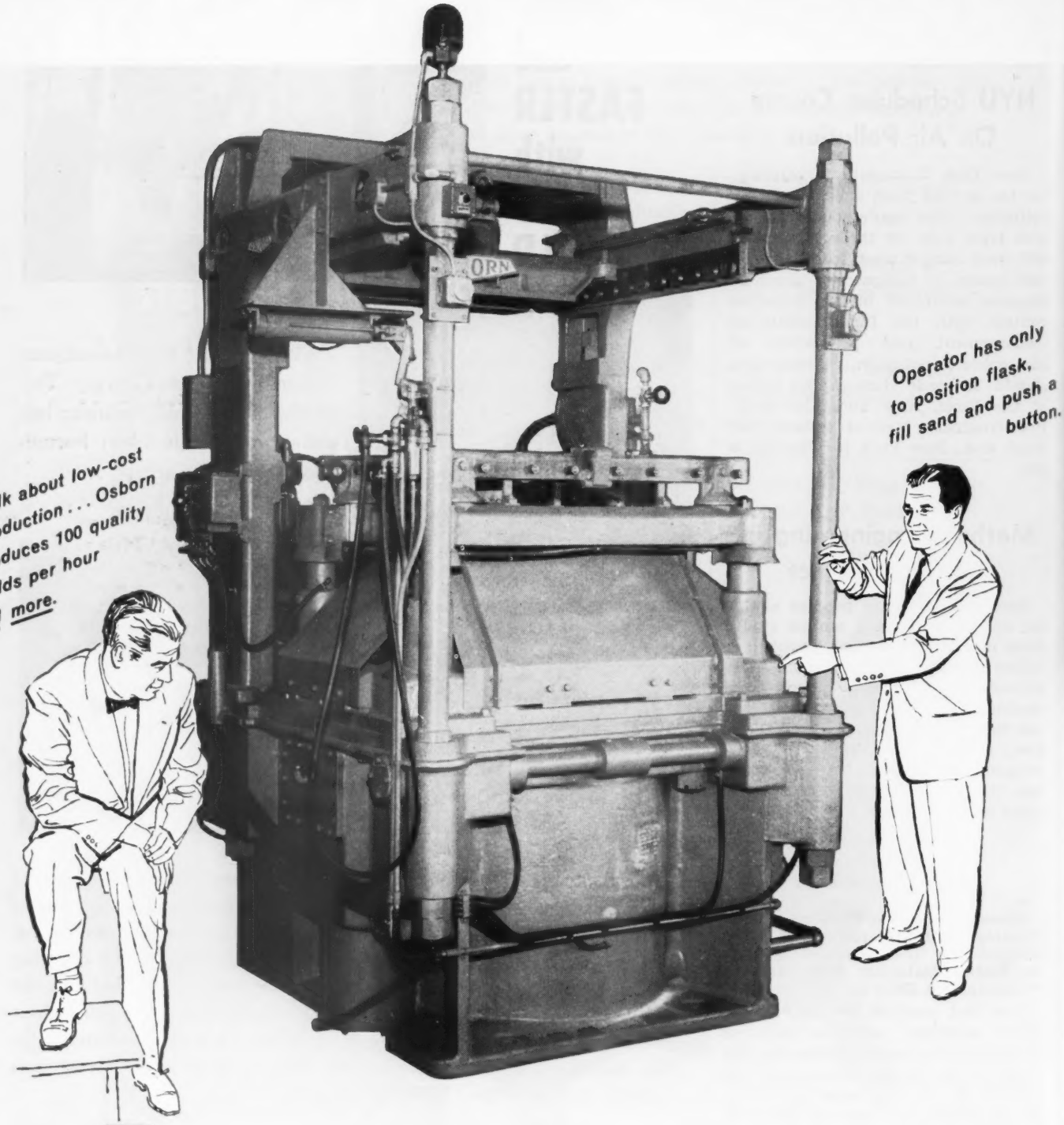
MACHINE DIVISION

OF

THE COLUMBIANA PUMP CO., COLUMBIANA, OHIO

Cutting costs with Osborn automation

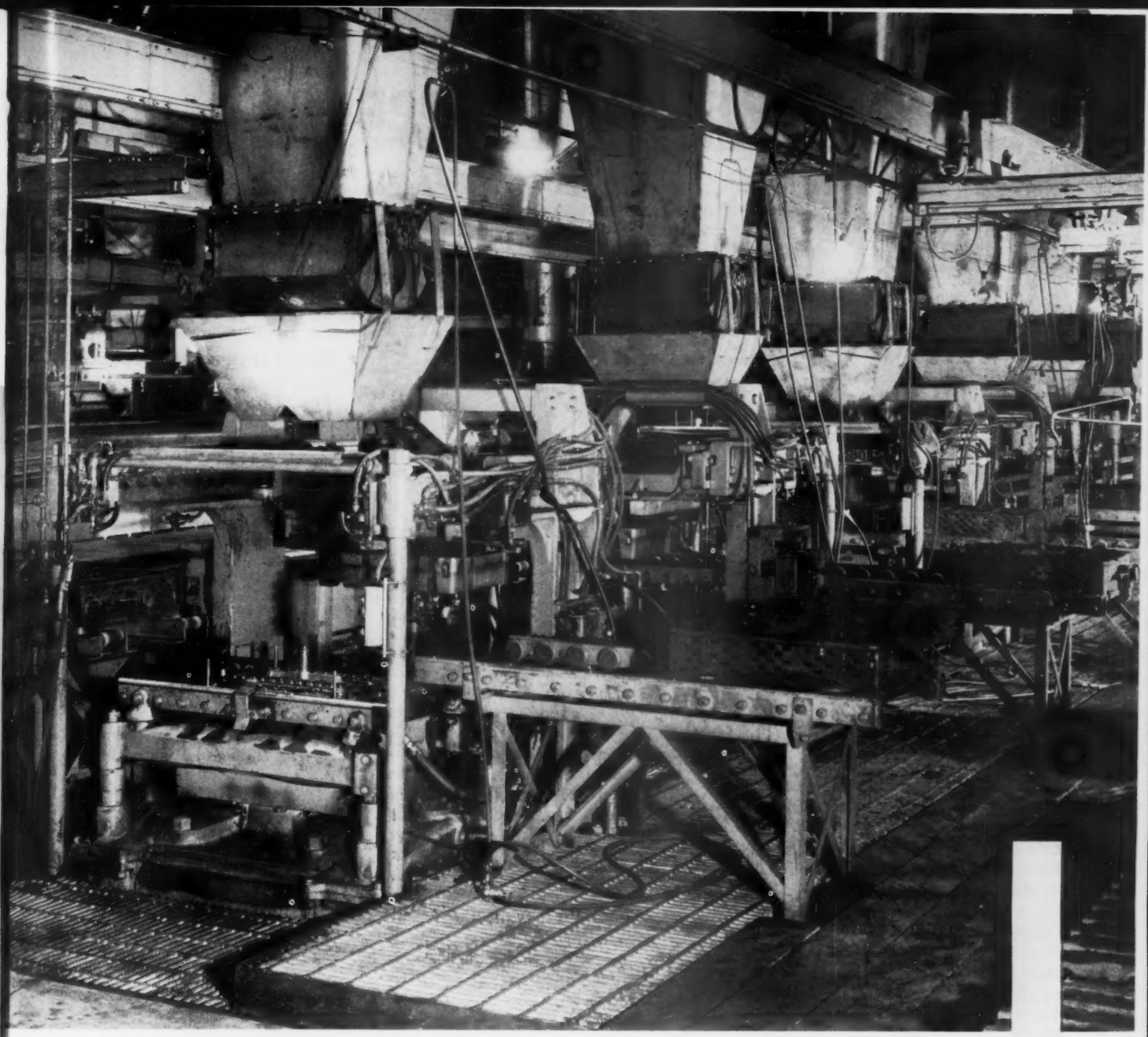
OSBORN JOLT SQUEEZE STRIPPER



Talk about low-cost production . . . Osborn produces 100 quality molds per hour and more.

Operator has only to position flask, fill sand and push a button.

OSBORN NO. 1236 JOLT SQUEEZE STRIPPER. *Available with semi-automatic and full automatic controls to operate on preset time cycles.*



FAST, EFFICIENT PRODUCTION *of cylinder head copes and drags on automotive installation of nine semi-automatic Osborn No. 1230 Jolt Squeeze Strippers. Each machine is equipped with side roll-on roll-off.*

Mechanizes production of large molds

WITH Osborn Jolt Squeeze Strippers, accuracy, uniformity are duplicated in each mold . . . at low cost. Because production is mechanized, output is constant throughout the day.

Operation can be manual or automatic. When manually controlled, the molder rolls on the flask, trips a valve that lowers the flask to the jolt table. The mold is filled with sand and a predetermined jolt cycle started by activating another control. Dual-operation valves are tripped for squeezing to assure operator safety. When furnished with semi-automatic or automatic controls, the Osborn Jolt Squeeze Stripper programs the entire production cycle, ejecting the finished mold.

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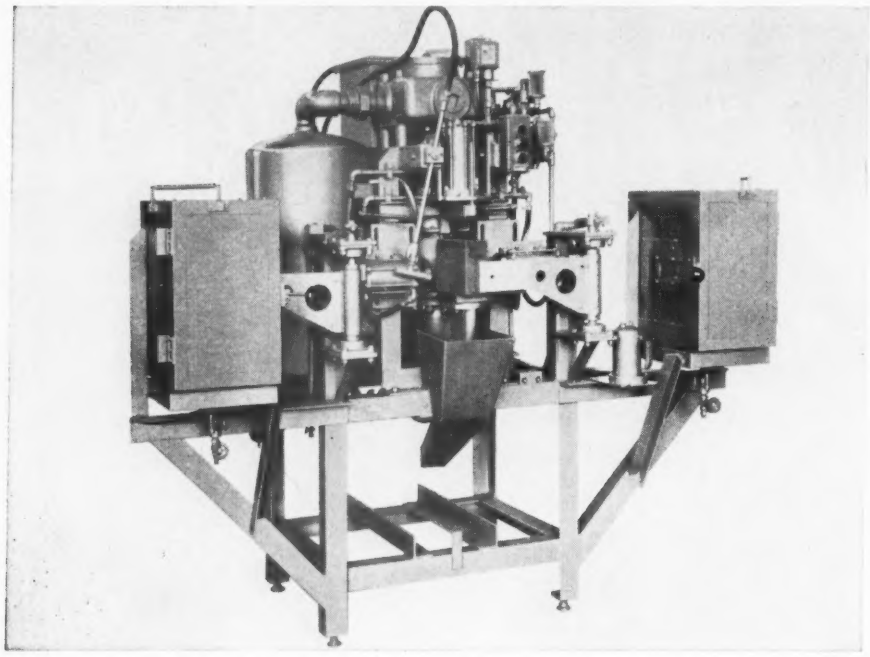


Core Machine: SPO Inc., 6448 Grand Division Ave., Cleveland 25, O.—Two-station coremaking machine requires one operator and is designed to produce hollow cores on a high-production basis without use of separate driers and baking ovens. Manufacturer claims it can be installed in production lines because cores are ready to use when removed from coreboxes. Unit is equipped with twin ovens and twin corebox mounts that will accommodate coreboxes up to 10 x 10 x 6 in. Mounts are pivoted to swing in a 180-degree arc between the ovens and the fill head located in the center of the machine. Finished cores are made in a 45-second cycle. Length of cycle depends upon size and complexity of individual core. All operations are automatic except positioning of coreboxes and removal of finished cores.

For More Details Circle No. 1—Page 199

Rubber Hose: B. F. Goodrich Co., Akron, O.—Abrasion-resistant rubber hose for industrial applications can transport objects or bulk materials inside the hose in a stream of water at pressures as high as 250 psi. Hose is available in diameters 1 to 14 in. for working pressures from 50 to 250 lbs. An interior spiral wire reinforces the hose to prevent kinking, crushing and collapsing.

For More Details Circle No. 2—Page 199

Riser Compound: Asbury Graphite Mills Inc., Asbury, N. J.—Noncarbon exothermic compound is used to assure complete feeding and sound castings with minimum height risers. Compound can be stirred to break up the initial skin and provide insulation without any deleterious material going into the casting, according to the manufacturer. It is said the compound will not form a hard crust or cause a void between the metal and riser material. It can be molded into shapes, used for all size heads, used on the most critical of steels, or with any method of casting. Material comes packaged in steel drums as powder and is applied as ½ to ¾-in. covering on riser top.

For More Details Circle No. 3—Page 199

Basket Sling: Wiretex Mfg. Co., 40 Mason St., Bridgeport, Conn.—Stainless steel basket and sling combination is made to carry parts into an annealing furnace operating at temperatures up to 1380° F. Four baskets can be nested in the sling. A self locking lift bar holds them securely in place. Baskets are 22 in. OD x 6½ in. deep and are constructed of wire mesh reinforced with ½-in. rod.

For More Details Circle No. 4—Page 199

Strain Instrument: Tinius Olsen Testing Machine Co., 1227 Easton Rd., Willow Grove, Pa.—Instrument for measuring large motions on specimens undergoing tension testing has magnifications of 1, ½ and ¼ for recording motions of 10, 20 or 40 in. Other instruments are available for gage lengths ranging from 3 to 10 in.

For More Details Circle No. 5—Page 199

Grinding Wheels: Colonial Abrasive Products Co., Conshohocken, Pa.—Resinoid grinding wheels for portable grinders feature two rings embedded in the usable portion of the wheel to provide strength and increase the safety factor. Rings are claimed to have greater tensile strength than steel but will abrade away during normal cutting of the wheel without interference to the grinding action. Rings are made of numerous glass filaments lapped together. Manufacturer reports that test runs have shown that cracked wheels can be run up to 20 per cent above normal cutting speeds without exploding. At present this safety feature has been extended only to straight wheels and type 5, 6, and 11 cups for portable grinders.

For More Details Circle No. 6—Page 199

Electric Cord: United States Rubber Co., Rockefeller Center, New York 20, N. Y.—Electrical cord is for use with power saws, grinders, drills, buffers, and similar types of portable electrical machinery. Following laboratory and field tests of causes of electrical cord failures, specific antidotes for the wear causing factors of heat, oil, impact, abrasion,

For more details on these items use reply card—page 199

flexing, cutting tension and tear were designed into the cord.

For More Details Circle No. 7—Page 199

Refractory Gun: Basic Refractories Inc., 845 Hanna Bldg., Cleveland 15, O.—Gun designed for air emplacement of granular basic refrac-

tories reportedly offers a quick, economical method of repairing linings in electric and open-hearth steelmaking furnaces, soaking pits, heating furnaces and cupolas. Hopper has a 20 cu ft capacity. An operating platform provides easy loading and accessibility to the control panel.

For More Details Circle No. 8—Page 199

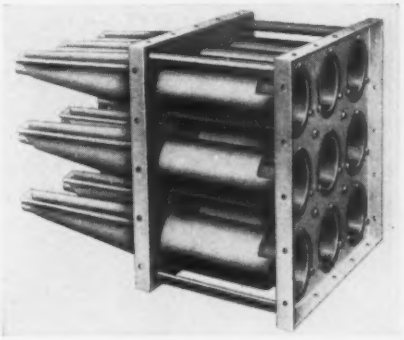
Belt Conveyor: Stephens-Adamson Mfg. Co., Aurora, Ill.—Pre-engineered belt conveyor components are available for repair or replacement units on existing conveyors or for complete installations. Units are designed for lengths up to 50 ft, and from 51 through 100 ft in both 18 and 24 in. belt widths. Limiting capacity for 18-in. belts is 150 tons per hour and for 24-in. belts, 250 tons per hour. Components include carrier and return roll, head and tail pulley assemblies, drive assembly, normal duty roller type hold back, spring type belt cleaner, and bent plate decking. Reducer drive with overhead motor or shaft mounted reducer are available.

For More Details Circle No. 9—Page 199

AC-DC Welder: Harnischfeger Corp., Welding Division, 4605 West National Ave., Milwaukee 46, Wis.—Single machine provides both alternating and direct current welding. A flip of the switch gives the desired welding current. It is possible to change from one current to the other while welding to take advantage of characteristics best suited for the work. The machine has ranges of 7 to 275 amp ac and 7 to 200 amp dc. It operates on 220/440-v, 50/60-cycle current, single phase. Control switch provides instantaneous heat selection. For remote control, a radio-type dial may be taken to the work.

For More Details Circle No. 10—Page 199

Dust Collector: American Air Filter Co., Louisville 8, Ky.—Compact, dry centrifugal dust collector features a conical inlet which imparts a swirling motion to dust particles, while permitting clean air to travel through a special tube without changing direction. Each tube has an approach velocity of 1000 fpm and a cleaning capacity of 333 fpm. Nine of these tubes are combined in a standard nodular cell which has a rating of 3000 cfm with a face area of 20 x 20 in. Any number of cells may be combined to achieve required capacity with available space. Design allows handling of widely fluctuating air volumes and dust concentrations with almost constant efficiency, according to the manufacturer. Standard model is limited to temperatures

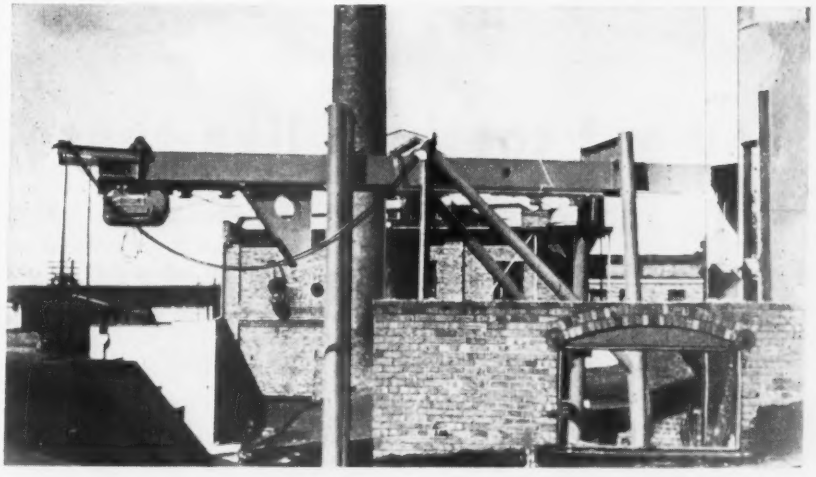


of 750° F. Special materials may be applied for higher temperatures. Unit has a pressure drop of 4½-in. at standard air (70° F, 29.92 in. Hg).

For More Details Circle No. 11—Page 199

Continuous Mixer: Colonial Iron Works Co., 17643 St. Clair Ave., Cleveland 10, O.—Continuous-type mixing and pugging machines for industrial use are engineered to handle any size material from dust to 1½-in., in either slurry or dry form. Mixers are manufactured with capacities to suit specific requirements. Features include all welded frame of steel plate, replaceable mixer trough,

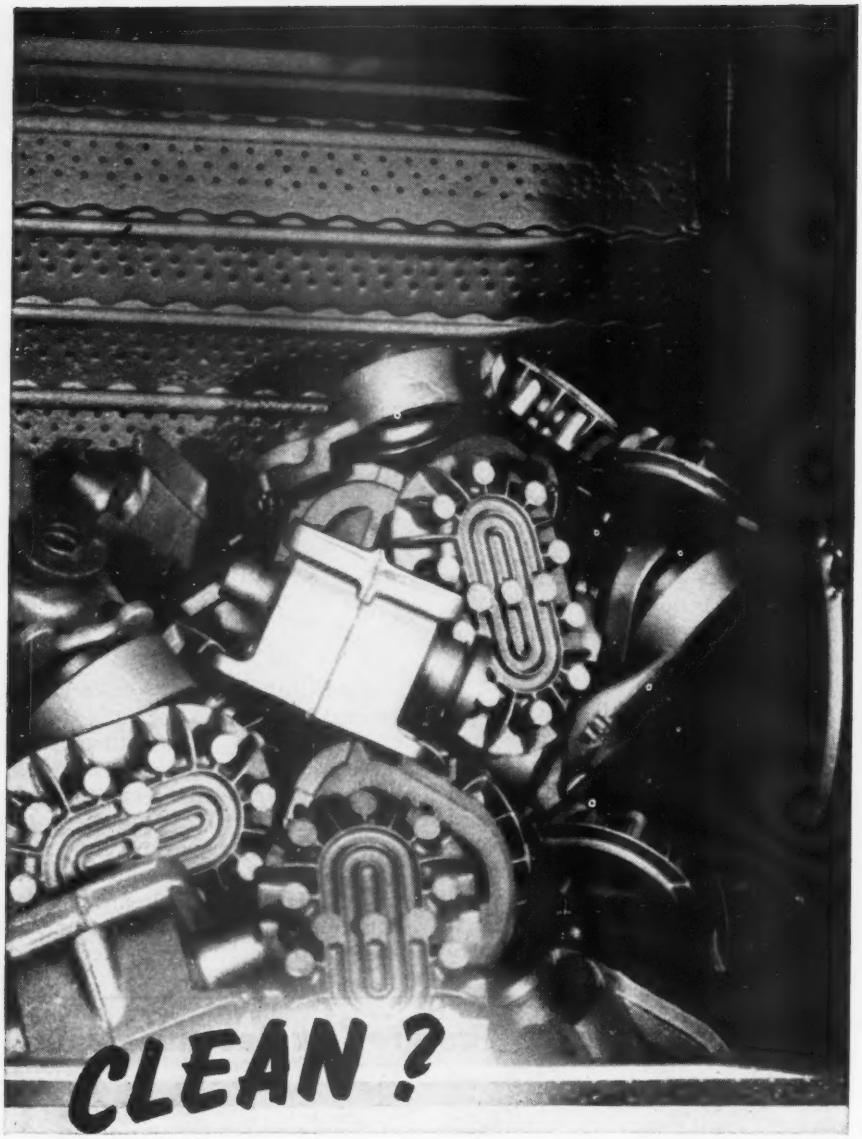
Cupola Charger Features 90-Second Cycle



SPECIALLY designed machine for charging cupolas is capable of placing a 1000-lb charge in either of two cupolas every one and one-half minutes. Its operation is entirely automatic but a special control panel is provided so the operator can control any one of the machine's movements individually. Two men are required to weigh and place the charge in the charging bucket. A single control push button then starts the automatic cycle.

Charging bucket is carried vertically to a predetermined height, then moves into the cupola where it is lowered and discharged. Bucket automatically returns to its original starting position and remains until the next automatic cycle is actuated. The machine is manufactured by Columbiana Pump Co., 131 East Railroad St., Columbiana, O.

For More Details Circle No. 12—Page 199



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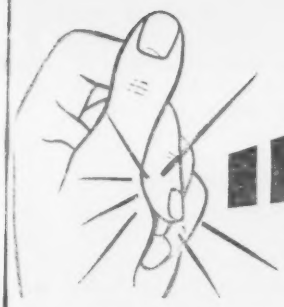
box type construction, safety guard over mixing portion of trough, simplified drive mechanism with standard NEMA frame motor, and a diversion plate at mixer discharge for elimination of segregation tendencies.
For More Details Circle No. 13—Page 199

Space Heaters: Edwin L. Wiegand Co., 7596 Thomas Blvd., Pittsburgh 8, Pa.—Three portable automatic space heaters have been added to company's line of electric comfort heating equipment. Units have built-

in thermostatic controls to maintain room temperatures at comfort level, and are heat powered with insulated, metal sheathed tubular elements. One of the heaters is a small 115 v heater with a capacity of 1500 w. The larger models are 230/240 v heaters rated at 2400 and 4800 w.
For More Details Circle No. 14—Page 199

Tracing Paper: Charles Bruning Co., 4700 Montrose Ave., Chicago 41, Ill.—Translucency, permanence, uniformity, penciling and erasibility are claimed for company's tracing papers and cloths. Tracing papers reportedly are odorless and cured so as not to become brittle or lose proper transparency. Negligible leaching occurs after long storage or where drafting tape is applied. Dual purpose tracing cloth reportedly accepts ink and pencil equally well. Ink lines do not chip or flake off and hard pencils neither skip nor damage the surface. Cloth also is impervious to common solvents, spilled liquids, etc.
For More Details Circle No. 15—Page 199

Barrel Inserts: Automotive Rubber Co., 12550 Beech Rd., Detroit 39, Mich.—Preformed, removable inserts of compounded neoprene or sheet rubber are said to render any 55 gal drum or barrel capable of holding
(*Continued on page* 201)



IDEAS FOR FOUNDRYMEN

HERE ARE QUICK REVIEWS OF NEW LITERATURE—available to foundrymen as "idea" and reference information. Readers in the United States and Canada may obtain copies by using the attached cards. Readers in foreign countries should write direct to the manufacturer offering literature.

81. Die Casting

American Zinc Institute Inc., 60 East 42nd St., New York 17, N. Y.—New 28-page booklet describes the die casting process as it affects design, machining and surface finish requirements. Advantages and limitations of zinc, aluminum, magnesium and copper-base alloys are discussed.

82. Foundry Facilities

Giffels & Vallet, Inc. L. Rossetti, Associated Engineers & Architects, 1000 Marquette Bldg., Detroit 26, Mich.—Services provided in the engineering of foundry facilities are described in an illustrated booklet. Examples of engineered installations are pictured.

83. Core Blower

Redford Iron & Equipment Co., 20733 Glendale, Detroit 23, Mich.—Bulletin 4-D illustrates a draw-type core blower designed to handle a wide range of work. Machine produces cores weighing from a few ounces to 10 lb; complete specifications are given in bulletin 4-D.

84. Rockwell Tester

Gries Industries Inc., Testing Machines Division, Beechwood Ave. at Second St., New Rochelle, N. Y.—Bulletin A-12 illustrates and lists features of a hardness testing machine for standard Rockwell tests. Other hardness machines are listed.

85. Industrial Cranes

Harnischfeger Corp., Milwaukee 46, Wis.—Applications, features and specifications of industrial cranes are listed in illustrated bulletin C6-3. Cranes for special applications are shown in operation.

86. Conveyor Belt Chart

Belting Department, Quaker Rubber Corp., Division of H. K. Porter Co., Tacony and Comly Sts., Philadelphia 24, Pa.—New color chart shows engineering data for standard conveyor belt constructions. Ultimate strength, fastener strength, operating strength and troughing index are shown graphically.

87. Air Tools

Rotor Tool Co., 26300 Lakeland Blvd., Cleveland 23, O.—Chippers, sand rammers, rotor grinders, right angle grinders, cone grinders and die grinders are listed in a 56-page air tool catalog, No. 38A. Pictures show use of tools performing foundry operations.

88. Magnesia Ramming Mix

Basic Refractories Inc., 845 Hanna Bldg., Cleveland 15, O.—New uses of magnesia ramming mix, designed for original bottom construction and maintenance of open hearth and electric steel producing furnaces are discussed in an illustrated booklet.

89. Core Rod Straightener

Hydro-Blast Corp., 2550 North Western Ave., Chicago 47, Ill.—Bulletin describes core rod straightening machine which automatically sorts and stores rods according to length. Specifications and dimensioned drawings of the machines are included.

90. Air Hoists and Valves

Curtis Pneumatic Machinery Division, Curtis Mfg. Co., St. Louis 20, Mo.—Air hoists, cylinders and valves are described in bulletin A-4-C. Engineering data and illustrations give further information.

91. Exhaust Fans

M & E Mfg. Co., 2571 Winthrop Ave., Indianapolis 5, Ind.— Bulletin 500 gives application data, specifications, illustrations and performance ratings for various styles and direct-connected exhaust fans.

92. Maintenance Program

Anderson-Nichols & Co., 150 Causeway St., Boston 14, Mass.—New 28-page brochure, "Get Better Maintenance," discusses the size and complexity of today's maintenance prob-

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lem, and the necessity of applying to it a sound engineering approach. A comprehensive maintenance program is presented.

93. Stop Control

Allis-Chalmers Mfg. Co., 1032 South 70th St., Milwaukee, Wis.—Automatic stop control designed to replace mechanical snubbing on vibrational equipment such as foundry shakeouts and vibrating screens with electrical braking action is described in leaflet 07B8141.

94. Gas Regulators

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.—Specifications and operating data of cylinder, manifold and pipeline regulators are described in catalog 806. Each regulator has a chart showing types of gages used with it, inlet and outlet connections, maximum flow and maximum working pressure.

95. Pumps and Compressors

Gardner-Denver Co., Quincy, Ill.,—Bulletin QP-11 presents standard types of air compressors and pumps. Both single and two-stage compressors are included. Tables and photographs of operating units complete the 40-page booklet.

96. Production Blasting

Pangborn Corp., Hagerstown, Md. —Continuous blasting barrel which eliminates manual handling and recovers all abrasives is shown in bulletin 226. Drawings picture operating features and dimensions of blasting machines.

97. Centrifugal Thrower Units

Stephens-Adamson Mfg. Co., Aurora, Ill.—Fixed and portable centrifugal thrower units for loading or storing bulk materials such as sand are pictured in bulletin 854. Operation and and installation information is included.

98. Cutting and Gouging

Arcair Co., P. O. Box 337, Lancaster, O.—Torch for metal removal using an electric arc and compressed air is shown in an illustrated booklet. Foundry applications are shown.

99. Porosity Detector

Botsford Chemical Co., Botsford, Conn.—Porosity detector for the aluminum foundry said to take one minute for testing is described in illustrated sheet.

100. Scientific Apparatus

Laboratory Equipment Corp., St. Joseph, Mich.—Catalog describes induction furnaces for carbon and sulphur analyses. Price lists are included.

101. Manganese Steel Chain

Taylor-Wharton Iron & Steel Co., High Bridge, N. J. — Heavy-duty chain for conveyors, drives, etc. recommended for working conditions where a combination of impact and abrasion are encountered is illustrated in a new bulletin. Detailed drawings and tables cover each type of chain.

102. Melting Furnaces

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.—Nonferrous melting furnaces of the motor generator type are covered in bulletin 26-B. Advantages, principles of operation, melting performance and insulation are among the topics considered.

103. Ductile Iron

International Nickel Co., 67 Wall St., New York 5, N. Y.—Actual case histories and wear test data on ductile iron are given in bulletin DI-20. Uses of ductile iron involving stringent operating and loading conditions are suggested.

104. Refractories

A. P. Green Fire Brick Co., Mexico, Mo.—Refractory bricks, mortars and coatings, castables and industrial insulations are described in large folder. Illustrations show applications of products. Tables and dimensioned drawings are included.

105. Shell Molding Machine

Shallway Corp., South Fourth St., Connellsville, Pa.—Complete cycle of shell molding operations is shown in bulletin 539-5. Features and specifications of new shell molding machine are given.

106. Aluminum Alloy Ingots

Sonken-Galamba Corp., Riverview at Second St., Kansas City 18, Kans. —Illustrated booklet gives features of the company and specifications of aluminum alloy ingot. Brass and bronze alloys also are listed.

107. Grinding Wheels

Cincinnati Milling Products Division, Cincinnati Milling Machine Co., Cincinnati 9, O.—Foundry cleaning room applications of grinding wheels are shown in illustrated brochure PGS-303.

108. Portable Power Tools

Syntron Co., Homer City, Pa.—Catalog 5410 features electric hammers, polishers, sanders and grinders. Information is given by pictures and specifications.

109. Sandblasting Equipment

Clementina Ltd., 2277 Jerrold Ave., San Francisco, Calif.—Sandblasting machines, nozzles and accessories are pictured in a 20-page booklet. A table of sand consumption is included.

110. Aluminum Jackets

Burr Aluminum, Burr Oak, Mich.—Features of aluminum jackets for light and medium castings are listed and pictured in publication.

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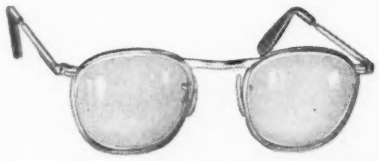
(*Continued from page* 198)

acids and other corrosive materials. Use of inserts makes barrels or drums adaptable for electroplating solution makeup, for acid dip, pickle or strip

operations, for solution storage, test tanks or for laboratory experimental purposes. Rubber insert is set in the drum and the "lip" provided on the insert is lapped over the top of the drum. Insert grips the drum and maintains a stationary position regardless of handling.

For More Details Circle No. 16—Page 199

Safety Goggles: Fendall Co., 4511 North Lincoln Ave., Chicago 25, Ill.—Line of spectacle-type goggles are designed to conform to the eye area of the face and provide a claimed increased safety factor. Widest point of the frame fits well into the nasal area, and is shaped to follow the side

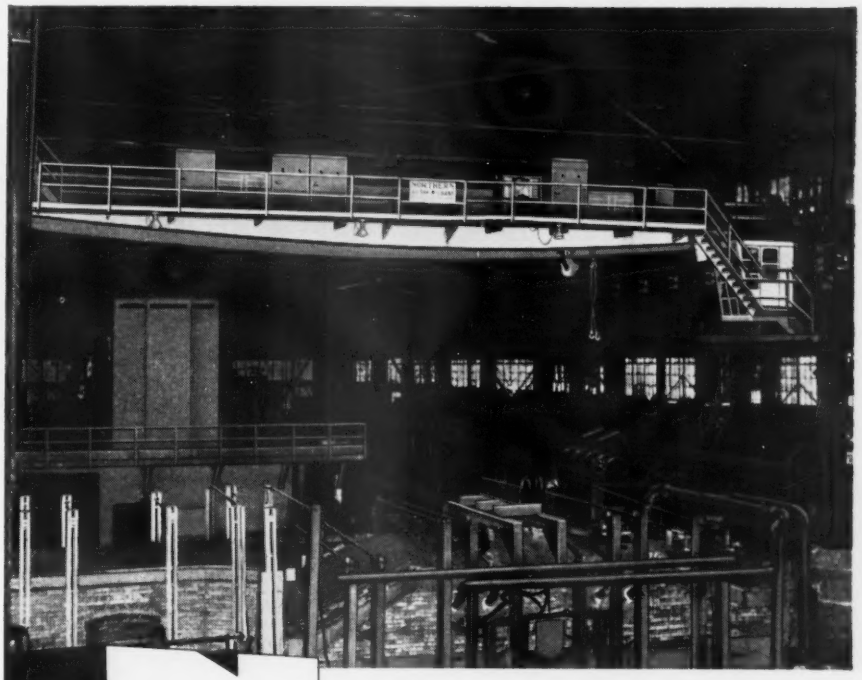


of the nose to prevent entrance of foreign particles. Produced in a complete range of lens and bridge sizes, the goggles are available in metal or nonflammable acetate frames. Metal frames are noncorrosive nickel silver and incorporate full-floating, rocking nose pads.

For More Details Circle No. 17—Page 199

Power Exhauster: Chicago Blower Corp., 9867 Pacific Ave., Franklin Park, Ill.—Power exhauster is designed for use wherever roof ventilation is applicable. Noise level is kept at a minimum by an air-flow design which allows low wheel tip speeds. Discharge cone utilizes the spin of the air which is discharged off the peripheral edge of the wheel to enter surrounding atmosphere with

Look overhead..see "NORTHERN"



NORTHERN CRANES *for severe service! for continuous operation! for safety and economy!*

The 40-ton NORTHERN SUPER CRANE shown is one of several Northern cranes operating in the Huntington Works of the International Nickel Company.

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NORTHERN ENGINEERING WORKS
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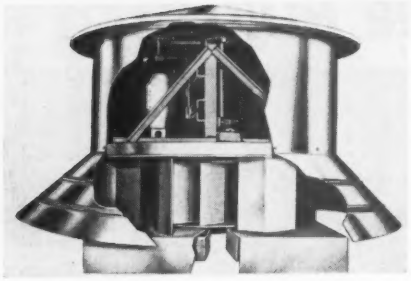
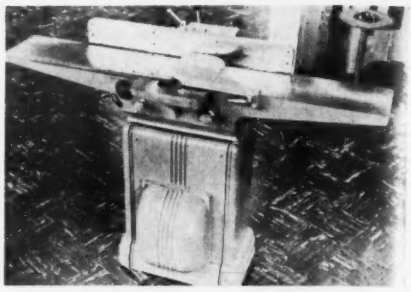


a minimum of turbulence and discharge loss. Motor is isolated from exhausting air and can be furnished for any current characteristics. Direct drive units deliver from 830 to 2590 cfm in sizes ranging from 107 to 150 with static pressures from ⅛ to ¾-in. V-belt drives deliver from 1420 to 29,750 cfm in fan sizes from 122 to 440 with static pressures of ⅛ to ¾-in.

For More Details Circle No. 18—Page 199

Jointer: Delta Power Tool Division, Rockwell Mfg. Co., 440 North Lexington Ave., Pittsburgh 8, Pa.—Company's 8-in. jointer has a plunger-type positive stop at zero and 45 degrees right and left. Table elevating mechanism features 6-in. gray iron hand wheels for easy manipulation. Adjustable infeed and outfeed tables ride in dovetailed ways equipped with a takeup gib to compensate for wear. Jointer has a 5-ft bed.

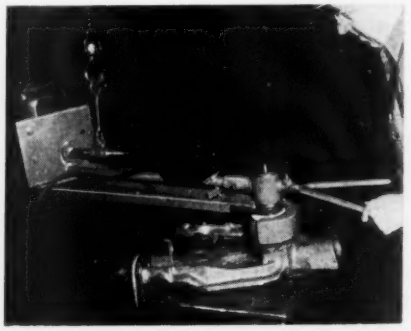


For More Details Circle No. 19—Page 199

Asbestos Gloves: Miller Products Co., 29 Warren St., New York 7, N. Y.—Line of asbestos gloves and mittens have been designed to add comfort to the wearer, reduce worker fatigue, and increase protective qualities, according to the manufacturer. Regular asbestos gloves and mittens, leather palm gloves and mittens, reversible mittens and reinforced mittens are offered.

For More Details Circle No. 20—Page 199

Swing Grinder: Fox Grinders Inc., Oliver Bldg., Pittsburgh 22, Pa.—Swing frame cup wheel grinder is designed for maneuverability and with ample power to use large, heavy cup type wheels. One model, weighing 150 lbs, uses either a 6 x 3 x ⅝-in. nut inserted wheel, type 11 or type 6, or a 9 x ¼ x ⅞-in. depressed center wheel, and is powered by a 2-hp motor. Another model, weighing 200 lbs, uses either an 8 x 3 x ⅞-in. recess one side, type 5 wheel, or a 9 x ¼ x ⅞-in. depressed center wheel, and is powered by a 3-hp motor.



For More Details Circle No. 21—Page 199

Vacuum Furnace: F. J. Stokes Machine Co., 5500 Tabor Rd., Philadelphia 20, Pa.—Vacuum melting and casting furnace for moderate production of high purity metals or for experimental and pilot-scale work has capacity of 50 lb of steel or other metals. The furnace chamber is a

Castings are on the move in Marion! . . . costs cut, production upped, shut-down time nil. And that's the story wherever STANDARD'S Twin-Wheel Snagging Grinders are on the job! Sizes to 100 hp, 20" to 30" wheels. Get the facts today . . . facts that mean a new kind of profit-FUTURE for your foundry. WRITE FOR LITERATURE.

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horizontal cylinder 4 ft in diam and 4 ft long. Full-opening hinged door provides access to interior of the chamber for charging, maintenance, or installation of additional equipment. Entire chamber is water jacketed. Two sight glasses are fitted in the side walls to permit observation of melting.

For More Details Circle No. 22—Page 199

Gage Set: Webber Gage Co., 12899 Triskett Rd., Cleveland 11, O. —Heavy duty 84-block gage set is said to be accurate within plus or minus 4 millionths of an inch and is designed to meet requirements of the majority of manufacturers of precision products. Set contains fixtures that will assemble the blocks for use

as dividers, scribers, and height or snap gages, in addition to normal gaging functions. Heavy duty blocks can be assembled into almost any desired length without use of accessories, according to the manufacturer, and the complete assembly can serve as a single gaging block.

For More Details Circle No. 23—Page 199

Electromagnetic Pump: Callery Chemical Co., Callery, Pa.—Alternating current, conduction type pumps operate on an electromagnetic principle, have no moving parts, no packing glands, and are designed to move liquids within cooling or heating systems, to force liquid metals into forms in die casting operations, or for general use wherever these metals must be forced from point to point. The unit can be installed in a hermetically sealed loop or in an open system. According to the manufacturer, it can be welded or flanged into any system and all pumps are equipped with welding connections.

For More Details Circle No. 24—Page 199

Wash Room Cleaner: Berman Chemical Co., 755 Superior St., Toledo 4, O.—Powdered chemical cleaner compound removes discolorations, algae accumulation, lime deposits, iron rust stains, soap oil and body grease in shower stalls. Cleaning is

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Only Semet-Solvay has 4 coke plants to serve you. There's one in your vicinity. For fast service, for dependable, uniform coke that means "Better Melting" specify Semet-Solvay Foundry Coke.

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Right from the start we thought enough about buckets to make them our specialty. That was 34 years ago. They're still our bread and butter.

Today, thousands of Erie units all over the world are turning in top performance. That's because they were built with a complete understanding of what they had to do.

Why not let our engineers review your set-up. There's no obligation. And, based on past experience, we're sure we can offer a helpful suggestion.

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FORMERLY ERIE STEEL CONSTRUCTION COMPANY
ERIE STRAYER CO.
SAME PEOPLE • SAME PRODUCTS • JUST A NEW NAME
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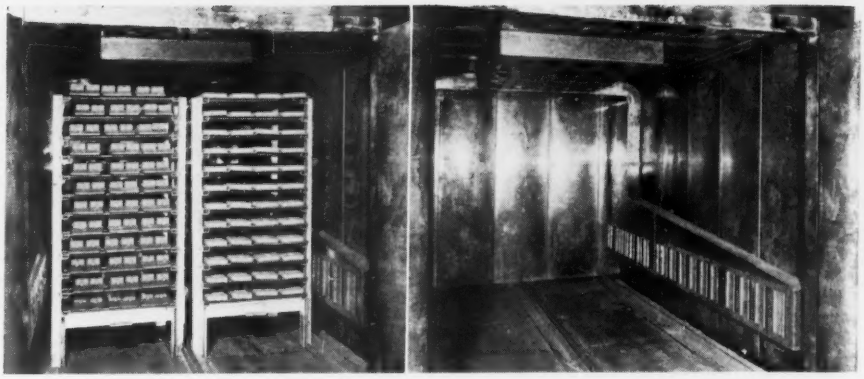
MODERN CORE OVEN

Saves Time and Fuel

By K. G. PHILLIPS
Industrial Oven Division
W. W. Sly Mfg. Co., Cleveland



INSTALLATION of a modern gas-fired, recirculating type convection oven has cut corebaking time in half at American Crucible Products Co., Lorain, O. In addition, recirculation of 85 per cent of the heated air back to the air heater permits considerable savings in fuel costs. Fifteen per cent of the hot air is exhausted to the atmosphere to carry off fumes and smoke from core oil. The air heater is sized to dry 5000 lb of cores, and the baking cycle is two hours at 450°F.

Cost of the natural gas fuel is 36 cents per hour. Dual fuel burners commonly are used in areas which curtail gas consumption in the winter, and comparable economy is expected with fuel oil.

Of basic, box-type design, the oven shell was made 13 ft 6 in. long by 8 ft 6 in. wide and 7 ft 8 in. high, outside dimensions. The oven accommodates eight core racks. Walls and ceiling are 4-in.-thick insulated steel panels, with interlocking male and female joints. Floor is insulating concrete covered with safety plate ¼-in. thick. Channel iron tracks locate core racks in proper positions, and swing doors in one end provide an opening 6 ft 10 in. wide and 6 ft 10 in. high.

To save valuable floor space, the air heater is located on top of the oven. The main supply fan distributes heated air to supply ducts on each side wall. Air passes upward through the open core racks and is returned by a recirculation duct on the ceiling to the air heater, where it is heated again and returned to the oven. An exhaust duct on the ceiling, over the doors, keeps the oven under suction and expels smoke and fumes through the exhaust fan to a stack.

Automatic temperature and safety controls, approved by Factory Mutual Insurance Cos., protect the entire system against fuel, air, motor or power failure and flame. On start-up, controls require the fans to operate for a predetermined interval before ignition can take place. This precaution assures that the oven is purged of volatile gases and fumes.

Similar air handling equipment and wall construction is used for high production, conveyor-type core ovens. The only difference is a matter of handling material in the most economical manner. Each foundry's problems must be solved to suit its particular requirements best.

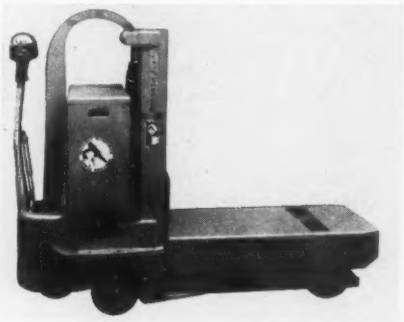
---

by chemical action. Compound is claimed safe for use on glass, porcelain, china, marble, tile, terrazzo, vitreous and concrete surfaces. It contains no caustics, lye, soap or carbonate, and reportedly will not injure hands, clothing, floors or drains.
For More Details Circle No. 25—Page 199

Nickel-Iron Battery: Edison Storage Battery Division, Thomas A. Edison Inc., West Orange, N. J.—Nickel-iron battery with all structural parts of nickel or nickel plated steel is claimed to be "tailor-made" for use in lift trucks where power requirements are high but space is limited. Battery reportedly provides 25 per cent more power in about the same space as its predecessor battery. Manufacturer asserts that the battery cannot be injured by reverse charging or short circuiting and can be laid up indefinitely without injury.
For More Details Circle No. 26—Page 199

Oil Sludge Remover: Magnus Chemical Co., South Ave., Garwood, N. J.—Addition of company's concentrate in proper proportion to sludged oil in storage tanks is said to eliminate malfunctioning and smoking of burners in oil-fired power plant and furnace installations. The concentrate contains a combination of dispersants which break down the sludge as well as water of condensation reported to be the cause of oil sludge.
For More Details Circle No. 27—Page 199

Walkie Trucks: Lewis-Shepard Products Inc., Dept R-61, Watertown, Mass.—Low-lift electric walkie trucks have capacities up to 16,000 lb and are built with an articulated frame



that permits use of stabilizing casters on the load-carrying frame. Driving portion and battery are hinged to the load carrying frame by a parallel linkage so the weight of the load does not fall on the drive wheel. Trucks have an electro-hydraulic lift of 4 in. which is controlled from the handle head. Electric brake can be released with the control handle in vertical position. Truck is capable of right angle turning in aisles 89 in. wide.
For More Details Circle No. 28—Page 199

Monel Electrode: Pacific Welding Alloys Mfg. Co., 312 North Ave., Los Angeles 31, Calif.—All-position monel electrode is for metallic arc welding of monel to monel, monel to steel, and nickel to steel. Manufacturer reports the electrode offers a fast rate of deposit, uniform bead characteristic and easy slag removal. A full range of sizes are offered and the rods are packaged in hermetically sealed containers to prevent moisture pick-up and rod scuffing.
For More Details Circle No. 29—Page 199

Rotating Crane Hooks: Heppenstall Co., Pittsburgh 1, Pa.—Motorized crane hook can be rotated through a full 360 degrees in either direction. All operations are con-

(*Continued on page* 206)

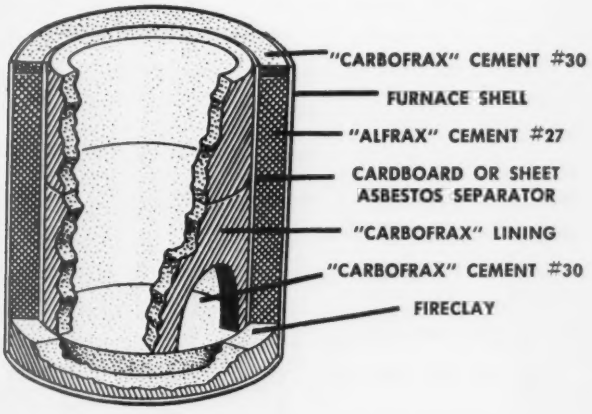
LOWER FIRING COST PER MELT

Here's the surest, most painless way we know to cut fuel and maintenance costs of nonferrous furnaces. You use one-piece CARBOFRAX® silicon carbide rings — they can be lifted and put in by hand — and back these up with castable ALFRAX® aluminum oxide cement. A complete lining takes only a couple of hours to install.

By combining these refractories, you get a highly efficient lining that usually *lasts 1½ to 2 years.* The silicon carbide rings do not soften, and go month after month with little or no patching. They give real "armor-plate" protection.

The castable cement, being made of thousands of tiny alumina "bubbles", is one of the best insulating refractories for high temperature work. As a result, the furnace has low heat capacity and heats quickly and uniformly. It is not uncommon to get one or two extra heats per day, and at the same time make substantial fuel savings per pound of metal melted.

May we send recommendations for your particular type of furnace? We make lining materials to fit every need—rings, ring segments, and cements. We can furnish design drawings and other helpful information if you will send just a brief outline of your operating conditions. No obligation, of course. Address: Dept. A-15, Refractories Division, The Carborundum Co., Perth Amboy, N. J.



Here's a typical ring/cement lining. The CARBOFRAX ring lining is only 1½" thick — hence there's more space for insulation, better protection against heat loss. • Castable ALFRAX cement #27 is used to back up the rings. (It's easy to install — just mix with water and handle like Portland cement.) • CARBOFRAX cement #30 is highly resistant to wear. It protects those areas exposed to flame and mechanical abrasion. It is rammed in the bottom, and also used to top off the ALFRAX lining.

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ABC Foundry Coke—the product of over 33 years of specialized experience and continuous research—is sold in 32 States and several foreign countries.

It is produced in one of the nation's largest and most modern plants.

Recently expanded coke production capacity—now over 900,000 tons of strictly merchant coke per year—enables ABC to meet the widely varying demands of its customers and assure them a thoroughly dependable source of supply during periods of peak demand.

Unlike most other coke plants, ABC has no blast furnace or other affiliations having first call on its production.

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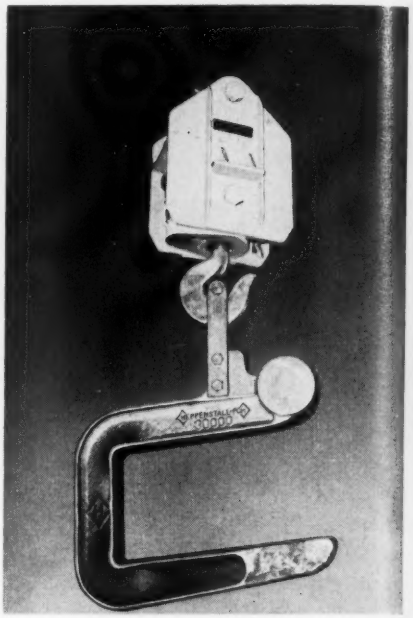
(*Continued from page* 204)

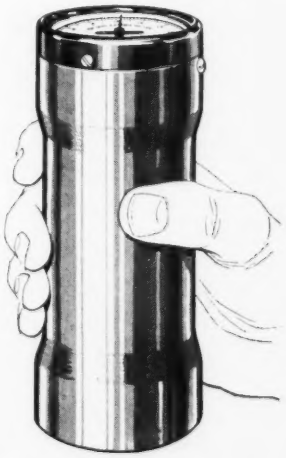
trolled by the craneman from his cab, with no need for a ground man to turn the load. Models with capacities as low as 1 ton or as high as 10 tons are available. A 1-hp electric motor provides power for turning the



hook. A centrifugal clutch provides a flexible coupling that prevents overloading the motor. The hook can be used by the craneman with automatic tongs, magnets, or sheet lifters to turn loads to the position required.

For More Details Circle No. 30—Page 199

Gas Analyzer: Burrell Corp., 2223 Fifth Ave., Pittsburgh 19, Pa.—Compact lightweight gas analyzing unit reportedly is simple to operate

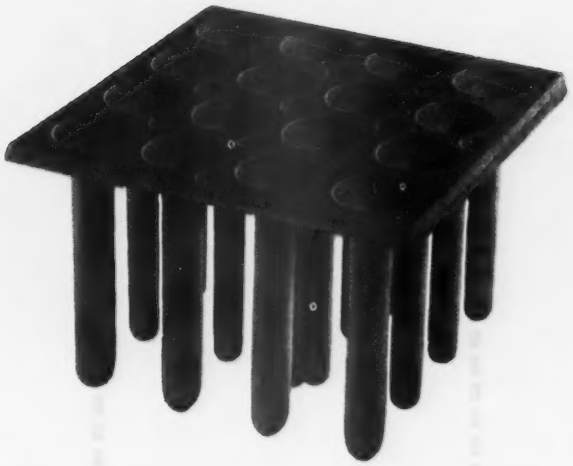


and provides speedy on-the-job determinations of carbon dioxide or oxygen in flue gases, furnace atmospheres and other gas mixtures. To operate, a rubber hand pump, supplied in each kit, is connected to the source of the gas by rubber tubing. By a few squeezes, a gas sample is

(*Continued on page* 208)

ACME RESIN

PlastiSand PROCESS



Resin formulation and the coating process covered by Patents Pending

Shell molding foundries are discovering the fact that when the PLASTISAND Process, using liquid-resin coated sand, is employed—DUST IS ELIMINATED. This feature alone makes the process invaluable because of the safety and health factor. The absence of dust means healthier working conditions, safer, cleaner factories. No irritating resin dust fumes, danger of dust explosion is eliminated—plant efficiency is increased.

In the PLASTISAND Process—each grain of sand is uniformly coated with partially polymerized thermosetting resin. Permanent, even distribution of the liquid resin throughout the sand results in smoother finishes and higher strengths.

PROVED SAVINGS, Too!

1. The PLASTISAND Process, a totally new development by Acme Resin Corporation in the relatively new field of foundry shell molding, assures savings—because of a shorter dwell, and a faster cure—shorter time on the pattern and a faster baking cycle.
2. You can be certain of superior molds with as little as one-*half* the resin content formerly necessary with dry resin.
3. Hot or cold mulling—adaptable to dump-box, roll-over and blowing of either shells or cores.
4. **SUPERIOR TENSILE STRENGTH**—PLASTISAND molds have greater cold strength, a factor gaining importance as new stack pouring techniques are developed.
5. **NON-SEGREGATING**—Each grain of sand is completely, uniformly coated with liquid phenolic resin in the PLASTISAND Process—segregation cannot occur.
6. **EXCELLENT HOT STRENGTH**—The hot strength of PLASTISAND molds is equal or superior to that obtained by the use of dry-resin sand mixes.
7. **GREATER PRODUCT UNIFORMITY**—Because it is non-segregating, resin-coated sand prepared by the PLASTISAND Process yields almost identical molds, batch after batch.

An informative booklet has been prepared to better acquaint the foundry industry with the new PLASTISAND Process. It may be obtained by writing to the ACME RESIN CORPORATION at the address listed below right.

20-POWER MAGNIFICATION OF RESIN-COATED GRAINS OF SAND.

ACME RESIN CORPORATION

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AUTOMATIC SAND CONTROLS

reduce scrap, increase sand production, and pay for themselves,

says Nelson Hartley HAYLCO CONTROLS CORP.

HARTLEY HYGRO-GUIDE
AUTOMATICALLY CONTROLS MOISTURE

HARTLEY TIME-GUIDE
AUTOMATICALLY CONTROLS EVERY PHASE OF MIXING CYCLE

BOND GUIDE
MEASURES AND CHARGES EXACT AMOUNT OF BOND AUTOMATICALLY

SAND LEVEL CONTROL
ASSURES THE MOLDER A CONSTANT SAND SUPPLY IN THE HOPPER

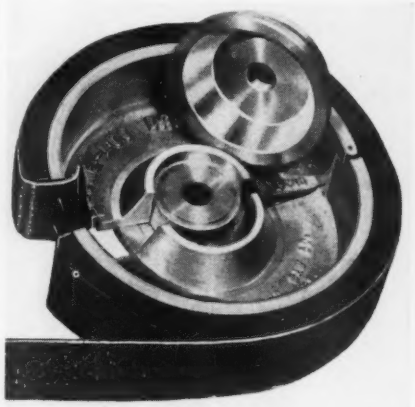
HAYLCO CONTROLS Corporation
NEENAH, WISCONSIN
The original manufacturer of automatic controls for sand systems.

(*Continued from page* 206)

in the analyzer. A shake or two and needle registers the percentage of gas present in the sample on a dial.

For More Details Circle No. 31—Page 199

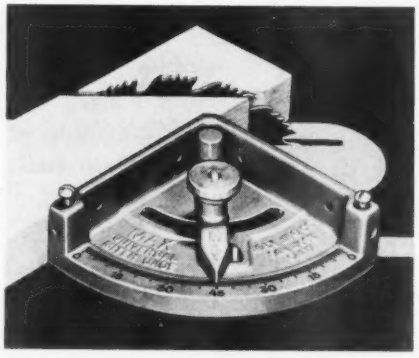
Drum Sander: American Diamond Saw Sales, Portland 9, Ore.—Drum sander of high tensile strength aluminum alloy features a split drum wheel that uses coated abrasive strips



of the type called "economy rolls." No special end clips are required. Drum assertedly will operate safely at speeds up to 9800 sfpm. A variety of diameters is available.

For More Details Circle No. 32—Page 199

Miter Gage: Max Mfg. Co., 138 Stockton Ave., San Jose 26, Calif.—Power tool protractor attachment has two working faces at right angles to each other to permit angle cutting or grinding with a full range of



single and complementary angles without change of settings. A radius arm permits the protractor to swivel near the corner of adjacent faces. Gage is mounted on a ⅜ x ¾-in. steel bar which fits most makes of power tools.

For More Details Circle No. 33—Page 199

Melting Furnace: General Electric Co., Schenectady 5, N. Y.—A cold mold type, inert atmosphere, arc melting furnace is designed to melt highly reactive or refractory metals. It can be used for limited production and is recommended as equipment for industrial and academic research laboratories in determining properties of

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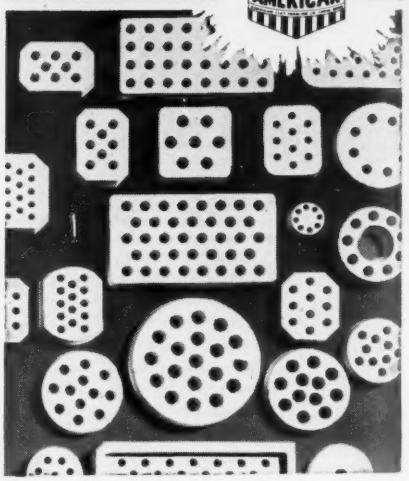

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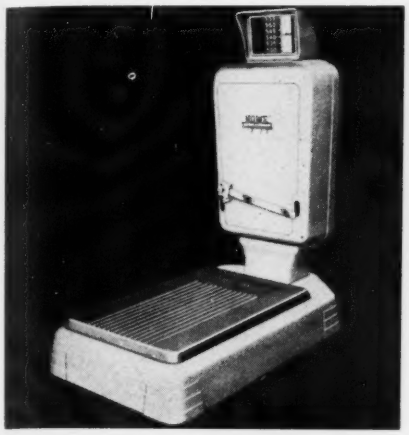
metals and alloys. Consumable electrode and fixed models are available. Furnace is equipped with devices which permit automatic control of metal feeding and movement of the electrode to station it the proper distance from the molten metal.

For More Details Circle No. 34—Page 199

Automatic Scale: Howe Scale Co., Rutland, Vt.—Automatic weighing unit incorporates a precision chart on microfilm and figures and



graduations are magnified 28 times their original size by optical projection and are reflected on a screen. The light source is a prefocused lamp engineered to intensify the light on the chart. The unit contains a positive drive, reportedly allows no lost motion or backlash. There is no rack and pinion, and backweighing is possible within front weighing tolerances.

For More Details Circle No. 35—Page 199

Welding Rod: Miracle Rod Co. of Illinois, 612 North Michigan Ave., Chicago 11, Ill.—Welding rod for die cast zinc, sheet aluminum, cast alu-

minum and galvanized tin is made for use in industrial work wherever sheet or cast aluminum is used. Rods are packaged 35 rods to a cylinder.

For More Details Circle No. 36—Page 199

Portable Heater: Fageol Heat Machine Co., Division of R. D. Fageol Co., Kent, O.—Portable heater for industrial use is self-contained and

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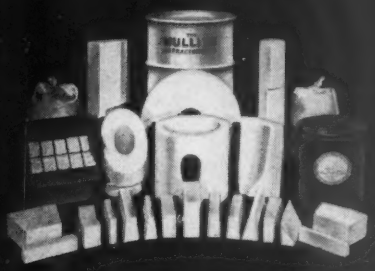

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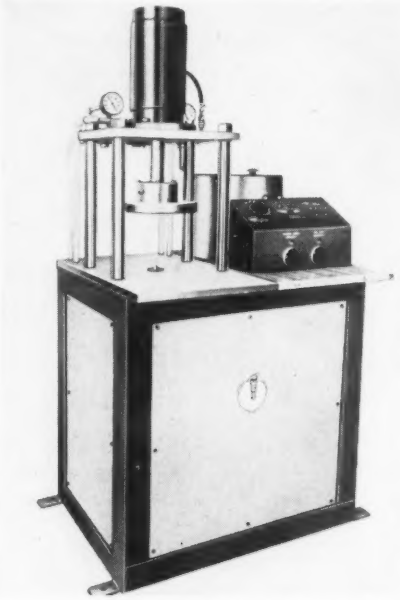
For More Details Circle No. 37—Page 199

Injection Press: Centrifugal Casting Supply Co., 147 West 42nd St., New York, N. Y.—Automatic injection press is for volume production of wax or plastic patterns for investment casting. Once mold is positioned over the injection nozzle on the work surface, mold is clamped, material injected and clamp released in one continuous operation. Injection time can be preset. All phases can be individually operated if desired. Tank holds 75 lb of injection material at temperatures of 120 to 250° F. Thermostat maintains temperature within 2 degrees. Injection pressures up to 1500 psi are possible. Working area will accommodate molds up to 8 x 14 in. of unlimited length.



For More Details Circle No. 38—Page 199

Intraplant Trailer: Rogers Bros. Corp., Albion, Pa.—Low bed heavy-duty trailer is for hauling heavy industrial units from place to place within plants where rail facilities are not available. The trailer has capacity of 50 tons and is 8 ft x 25 ft, less drawbar. Tires are solid rubber with wide faces. Hauled by tractor or industrial truck, the trailers' travel is limited only by width clearances.

For More Details Circle No. 39—Page 199

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Hot Blast Systems

(*Continued from page* 95)

below the charging door and passed through a dust separator and then into a vertical, cylindrical combustion chamber. The burning gases were then circulated upward around the banks of heat exchange tubes by means of a series of baffles.

Small, thin steel tubes were used and good thermal efficiency was attained as long as the tubes were clean. However, because attempts to clean the effluent gases failed and because the system could only be cleaned on week ends, when it was cool, the outside of the tubes became so coated with dust by the end of the week that desired preheated blast temperatures could not be maintained. On Mondays the blast temperature would be near 900° F, but on Fridays the blast temperature would run about 650° F.

Transpose Gas and Air

A later design, shown in Fig. 5, utilizes all of the cupola gases. The gases are taken off immediately below the charging door (which is closed by swinging doors) through a dust separator, into a combustion chamber, upward through 4-in. steel tubes and out through the exhaust fan. Combustion air is supplied from a branch of the cupola blast line. The cupola blast air is circulated around the heat exchange tubes instead of through them. This heat exchanger uses larger and heavier tubes than the earlier design but because all of the gases are used and because it is more easily cleaned, consistently high preheated air temperatures have been attained.

Economizer System—Another European design is the Economizer, designed and manufactured by Vereinigte Ekonomiser Werke of Hilden, Germany. A typical installation is shown in Fig. 6. The effluent gases are drawn off from the cupola through a single duct and pass upward through a combustion chamber, around a series of banks of finned, cast iron heat exchange elements and out to the atmosphere. The incoming blast air is taken up, forced through each bank of alloy cast iron elements in a path perpendicular to the flow of the effluent gases, downward into a vertical pipe and into the tuyeres. A portion of the preheated air is by-passed to the combustion chamber for the purpose of burning the carbon monoxide.

Cleaning of the heat exchange tubes is simply done by blowing compressed air over them. This is usually done in the morning before the cupola is started and requires about one-half hour per day. The

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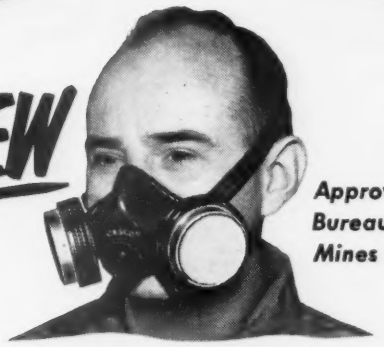

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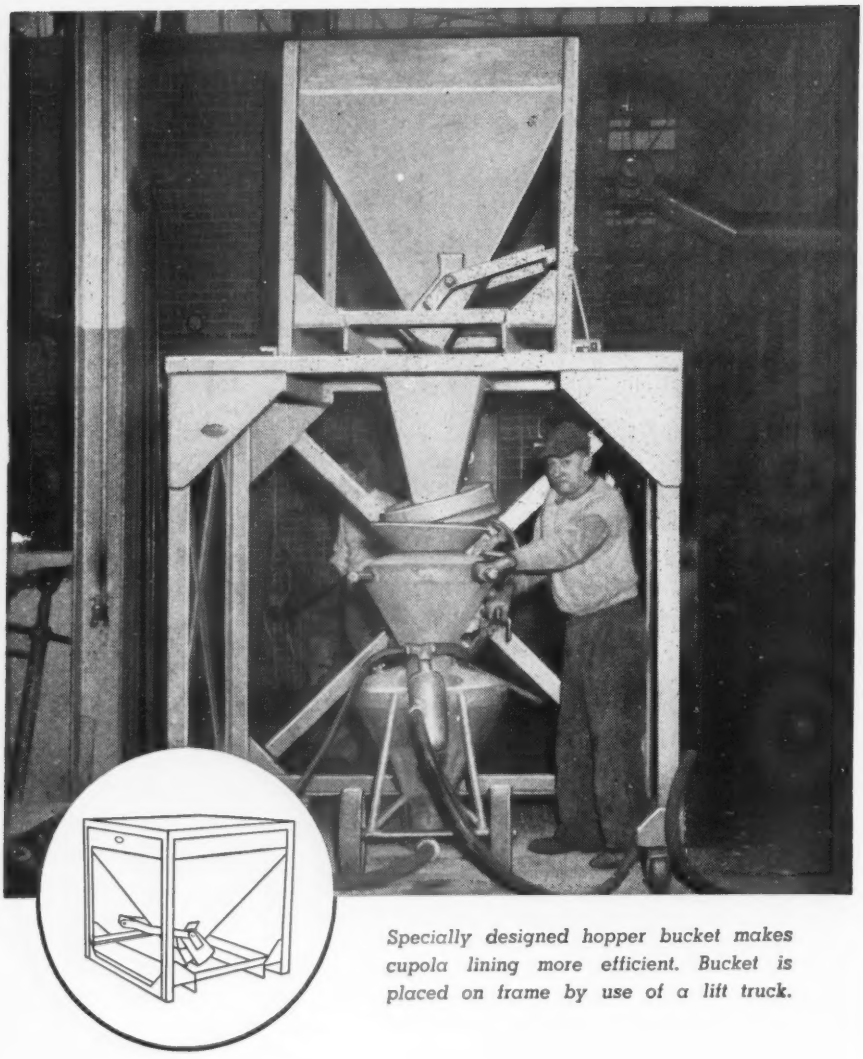

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tubes are made of a heat-resisting cast iron and are oval in shape with fins on the outside. Their inside dimensions are 6″ x 3″.

Externally Fired — The Todd Thermo hot blast, shown in Fig. 7, does not use the cupola exhaust gases to preheat the blast air. Instead, a burner fired by oil or gas is used. The burner is arranged in an all-metal combustion chamber and the incoming air used for combustion is passed over the walls, thus cooling the walls and preheating the combustion air.

The hot gases are drawn from the combustion chamber around two or more hairpin tube banks, where heat is given off, to the exhaust fan and atmosphere. The incoming cupola blast air is pumped in a contraflow direction through the hairpin tube banks and into the tuyeres.

Oil atomizers of different sizes are used in the burner to take care of the various loads required. These atomizers can be changed during the operation period without seriously losing temperature.

Tubes Can Move

A Todd Thermo heater designed for a preheated blast temperature of 1000° F and 6750 cfm will consume about 494 pounds, or 62 gallons, of No. 2 fuel oil per hour (about 520 pounds air per minute and 500 pounds of oil per hour). For this load, a 25-hp motor is required to deliver the combustibles (combustion air fan as shown in the illustration).

In a three-bank installation used in the East the front bank of tubes is of 304 stainless, the second bank of calorized steel and the third bank of plain steel. This system delivers preheated air at temperatures of 1000° F. The tubes being shaped in the form of a "hairpin" are allowed full, unobstructed movement through expansion. As each tube floats free of the other no distortion of tubes or casing is experienced.

When starting operations, the Todd system can be brought up to temperature at a rate of about 20° F per minute. This is controlled manually until the blast is within 50° F of operating temperature. Operation is then turned over to the automatic controls.

As mentioned earlier, an externally fired hot blast system is operated independently from the cupola operation. This permits the heater to be brought up to heat before the blast air is needed in the cupola, the blast air being by-passed to the atmosphere. When melting is to be started the blast air is at the desired temperature. Similarly, during periods of intermittent tapping or during a cupola shutdown, the hot air blast is

(*Continued on page* 214)

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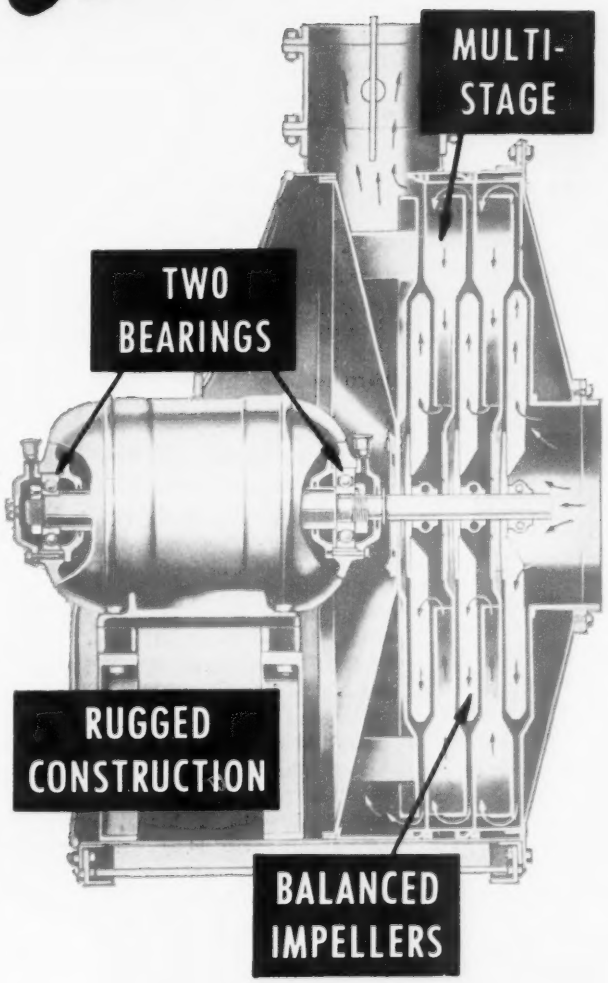

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(*Continued from page* 212)

by-passed and no drop in temperature of the blast is experienced when operations are resumed.

Interlocking controls guard the equipment. Should the cupola blower stop or if the air flow falls below a certain minimum level, the burner flame is automatically shut off. If the flame goes out, the oil flow to the burner stops.

Ross System—The Ross system shown in Fig. 8 is fired by oil or gas. The heaters are made in units so that the amount of air required and the temperature of the blast desired determine the number of heating units to be used. The combustion chamber is lined with refractory tile and countercurrent heat exchangers are used. An exhaust fan draws the hot gases around the heat exchange tubes while the incoming blast air is passed through the tubes. The heat exchange tubes are made of alloy or carbon steel depending on temperatures used.

Whiting System—The Whiting hot blast system, shown in Fig. 9, is an externally fired type. Coal, hand shoveled or stoker fed, pulverized coal, oil or gas is used for fuel.

The burning gases pass around banks of tubes through which the blast air is pumped. Blast temperatures of 400° F to 500° F are usually attained. In one laboratory installation the tubes were made of a nickel-chrome steel in order to permit the use of preheated blast temperatures approaching 1500° F.

Foreign Externally Fired — The Schack externally fired hot blast system installed at George Fischer Works, Schaffhausen, Switzerland, was perhaps the first commerical installation using hot blast temperatures in the order of 750° to 900° F. The results obtained from this installation indicated the value of using these higher temperatures in the preheated blast. Melting loss was reduced about 50 per cent and silicon losses through oxidation were cut from 22 per cent with cold blast to 5 per cent with a blast temperature of about 850° F. Ferromanganese consumption was reduced by less oxidation of manganese in the cupola and through a lower requirement of manganese because of lower sulphur content in the iron.

This hot blast installation is fired by producer gas. The gas, burned in a separate chamber, passes upward and around a bank of small, relatively thin-walled, heat-resisting steel heat exchange tubes. The incoming blast air is passed through the tubes in a contra-flow direction to the cupola windbox.

An overall savings in fuel is obtained as less fuel is used to fire the hot blast system and cupola than

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is necessary to melt the cupola charge under cold blast conditions. This installation, although very efficient, was the forerunner of the Schack designed recuperative systems described previously.

Comparison of Two Types—Both have their advantages and disadvantages:

1. The recuperative type requires only enough purchased fuel to burn a pilot light to assure the ignition of the cupola exhaust gases. The externally fired hot blast system requires the use of purchased fuel.

2. The recuperative type has to be cleaned frequently while cleaning and maintenance on the externally fired types are much less of a problem.

3. The recuperative type does not attain peak performance at the start of the cupola heat but requires from one-half to one hour to attain operating temperatures. The externally fired type can be preheated independently of the cupola's operation and desired temperature reached in the blast from the start of the heat.

4. Less fluctuation is experienced in blast temperatures, particularly during periods of intermittent melting, when using an externally fired type as the preheated air is by-passed to the atmosphere when the cupola blower is not operating. Also, somewhat greater watchfulness has to be exercised by the cupola tender in operating a recuperative type of hot blast when melting is stopped or is intermittent.

5. Fly ash and cinder emission to the atmosphere is reduced in the recuperative type of hot blast system. Compliance with many of the cities' smoke abatement ordinances can not be met, however, by merely drawing the effluent gases through a hot blast system.

6. Original installation costs are much lower on an externally fired type. Maintenance costs are generally lower on the externally fired types.

Summary—It is a well known fact that the cupola has a melting efficiency of about 35 to 40 per cent and a combustion efficiency of the order of 60 to 75 per cent. The cupola has been and continues to be the most economical method of producing cast iron.

This fact does not preclude further reductions in melting cost. Better efficiency through the use of blast preheating is a proven method of accomplishing this end. The two basic methods of blast preheating have their advantages and disadvantages and both have their staunch supporters. The trend in the use of hot blast seems to be toward higher blast temperatures of about 800° to 1000° F although present general practice is more nearly 350° F to

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a temperature of about 600° F.

With increasing temperatures of the preheated blast, lower oxidation losses of iron, manganese and silicon are experienced up to about 900° F when the silicon loss becomes nil. Still higher blast temperatures have resulted in silicon pickup through reduction.

Hot blast can result in coke economy, in higher metal temperatures, in faster melting rates or in a combination of all three. Hot blast operation is welcomed by the operating men because of more trouble-free uniform melting conditions.

Aluminum Practice

(*Continued from page* 91)

is given off which is corrosive to equipment and can constitute a health hazard. Great care must be used to prevent both salts from picking up moisture from the air. These chloride salts accomplish gas removal and provide a dry dross but are not widely used in foundries any more because of the difficulties in handling and because of the fumes generated.

Other salts, such as sodium or potassium chloride or fluoride, may, in the right combinations, produce an effective flux for dross separation or gas removal. They have limited use, however, because of the health hazard problem which they present.

More commonly used in present-day aluminum foundry practice are the gaseous fluxes—nitrogen and chlorine. Both gases are bubbled through the melt with a tube which carries the gas well down in the melt. With nitrogen, the tube may be coated iron or steel, but it must be of graphite or a suitable ceramic if chlorine is used. Because chlorine combines with iron at elevated temperatures, an iron tube would be destroyed rapidly from the inside.

The action of nitrogen is purely mechanical in that the hydrogen diffuses into the bubbles as they rise to the surface. The rate at which the nitrogen is allowed to flow is governed by the action at the melt surface. The higher the flow rate, the more rapidly the hydrogen will be removed, but the speed is limited by splashing of the metal. Effective nitrogen fluxing can be done from about 1250° F up to pouring temperature and should proceed long enough to reduce the gas content to a satisfactory low level. Under normal conditions, 3 cu ft of gas per 100 lb of metal will give satisfactory results. Fluxing time usually is 10 to 20 minutes for a 300 to 400-lb melt.

The amount of fluxing required depends upon the previous melt history and the nature and quality re-

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quirements of the castings being produced. Small or thin-section or heavily chilled castings are less likely to show gas porosity on machining or radiographic inspection than large or heavy-section castings which cool more slowly. When the allowable level of gas has been determined for a given operation, observation of the machined surfaces of standard slab castings may be used as a method of routine control of the melting and degassing operation.

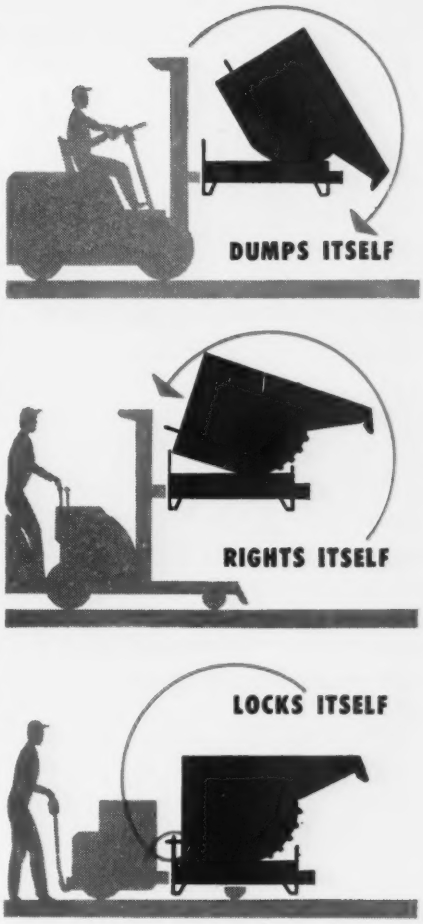
The action of chlorine as a fluxing agent is chemical as well as mechanical. Chlorine is probably the most effective degassing agent, but it has certain disadvantages. Most obvious is the health hazard, because of the fumes generated, and proper hooding and ventilation are essential. Even at best, the corrosive nature of the fumes creates a problem. Chlorine removes sodium and magnesium from alloys containing those elements, and long fluxing treatments should be avoided with such alloys. There is also a distinct tendency toward grain coarsening when chlorine is used in the degassing operation.

After fluxing, the melt should be allowed to stand for 10 to 20 minutes to allow any dross entrained in the body of the melt to separate. Then the metal should be skimmed.

Pouring Practice—Because of the tendency of aluminum to form dross and pick up gas, transfer and pouring techniques are important. Agitation of the molten metal in the melting pot or in transporting it to the mold increases dross formation and should be minimized. When transferring from the furnace to ladle, or from the ladle to mold, the metal should be poured smoothly without interruption. The stream should be kept as short as possible and unbroken. If this is done carefully, an oxide envelope will form around the stream which will protect the bulk of the metal from contact with the atmosphere. During pouring, the ladle should be kept close to the sprue since splashing at this point may generate dross which will be carried into the casting.

To minimize the introduction of dross into melts, borings and sawings should not be charged back with good foundry ingot. It is better practice to melt this kind of scrap separately, flux to remove gas and dross and cast into ingot before remelting for use in the foundry.

Molding and Coremaking — The practice of sand molding for aluminum alloy castings is fundamentally the same as for other metals, but differs in emphasis on several details. For example, in the customary pouring temperature range of 1250 to 1450° F, aluminum alloys exhibit



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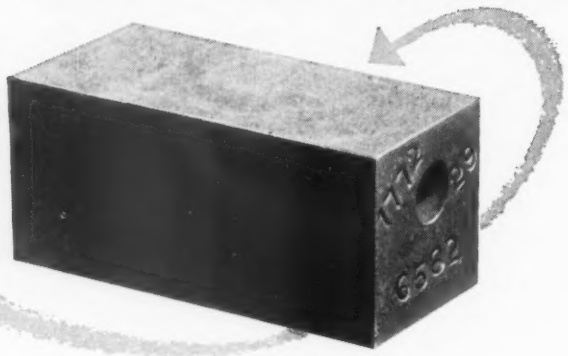

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such a slight tendency to react chemically with silica molds that no special attention need be given to the refractoriness of the sand. On the other hand, as pointed out earlier, the molten metal has a strong affinity for moisture, reacting to produce hydrogen which may form porosity in castings. For this reason, it is necessary to control carefully the moisture content and permeability of sand molds. The specific gravity of aluminum alloys is only about one-third that of iron or copper-base alloys, and the mold pressures developed during casting therefore are less. Sand bond strengths, degree of ramming and barring and clamping of copes should be governed accordingly.

Green Sand Molding—Three types of sand commonly are employed: Natural, semisynthetic, and synthetic. The choice of one of these types depends to a large extent on the kind of reconditioning equipment available and on the nature of the castings made. Certain sands can be used substantially as they occur in nature since they have a high clay content, usually ranging from 12 to 25 per cent, together with some impurities and foreign material such as silt and organic matter. Natural sands require a minimum of initial preparation for molding. Hand shoveling or a sand cutter can be employed for mixing to the required moisture content and for daily conditioning.

Natural sands used for aluminum usually are quite fine, require high percentages of tempering water and have relatively low permeabilities. Although smoother casting surfaces can be obtained with some of these fine-grained natural sands than with the somewhat coarser synthetic types, more care must be exercised to prevent a combination of low permeability and high moisture content from causing blows, gas-holes and pinhole porosity. Facing sands usually are not necessary, although in certain cases new molding sand is used as a facing if the condition of the main body of sand has become poor through long, continued use.

A gradual loss of strength is suffered by molding sands because of changes that occur in the clay bond when the sand is heated by the casting process. The bond must be reactivated or replaced so that the sand can be maintained in a workable condition. New bond can be added to natural sands with new sand facing, as mentioned previously, or small amounts of new sand can be added to the floor heap as required. In some instances, when the sand has been in use for a considerable period, complete replacement of the heap may be necessary.

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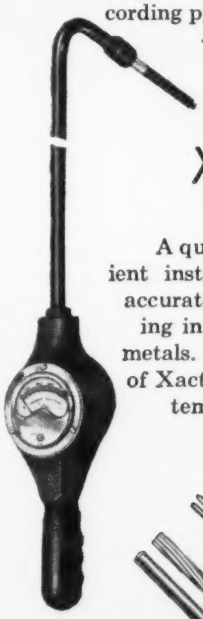

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bond strength of natural sands is through the addition of western or southern bentonite. Thus the sand becomes a semisynthetic sand. For maximum benefit from this procedure, some type of mixing equipment should be used to distribute the new clay uniformly in the used sand. Because bentonite is a more efficient binder than the relatively impure natural clay, only small percentages are required to bring the strength of a used natural sand back to a workable level. Semisynthetic sands also are prepared by adding bentonite to a base sand when it originally contains insufficient natural clay to provide the required strength for molding. The characteristics of semisynthetic sands are intermediate between natural and synthetic sands, but more nearly resemble the natural, since chief reliance is placed on the naturally occurring clay.

Synthetic molding sands are coming into widespread use in aluminum foundries. Because their properties can be accurately controlled, scrap losses are lower. However, more mixing equipment and an expanded testing program are required to obtain all the benefits. Base sands for synthetic mixes may vary from a high purity, washed, dried and screened silica sand to a relatively impure bank sand containing small quantities of natural clay. Western or southern bentonite, or a mixture of both, is added as the principal bonding agent. An auxiliary binder, such as corn flour, is added to help control sand expansion defects.

Mechanical mixing equipment is essential in the preparation of synthetic sand. The bentonite should be mixed thoroughly into the base sand to obtain an even coating of the grains, and a controlled amount of water should be distributed uniformly to provide optimum molding properties. The more intensive types of mixers that result in a mulling action give the best results, although paddle mixers, floor sand cutters and mechanical aerators also can be used.

The properties of synthetic sand are controlled within close limits by the addition during the reconditioning cycle of small amounts of bentonite, cereal flour and water. The size of these additions is determined by the results of sand tests. This constant adjustment of sand properties on a cyclic basis is necessary to maintain proper control of synthetic sands.

Coremaking and Baked Sand Molding—Silica sand is the most generally used base material for cores in aluminum castings. A wide choice of core sands is available, varying in grain shape, size, distribution and purity. Since these sands vary greatly in their binder requirements, care

should be taken to choose not necessarily the lowest cost sand, but one which will be the most economical from the standpoint of binder consumption, surface finish produced and workability in the coreroom.

An aluminum foundry usually requires several different core mix formulations, each designed to emphasize one or more characteristics needed for castings of specific design classifications. When the need for smooth casting surfaces is paramount and the problem of venting off core gas is not severe, the mix usually is based on use of a relatively fine-grained sand. However, when a casting contains cores of small and intricate cross-section which will be surrounded by heavy sections of metal, the need for high permeability in the core mix must take precedence. A coarse-grained sand should be used even though it involves the sacrifice of surface smoothness. Most aluminum foundries also devise special core mixes for use in blowing machines which emphasize those properties that permit the sand to blow freely.

Use Three Types of Binders

Two classes of binders are employed—one primarily to develop baked strength, and another with the principal function of providing green strength for resistance to sagging of cores in the unbaked condition. Binders commonly used for baked strength consist of three types: 1. Core oils which harden by a combination of oxidation and polymerization and are formulated principally from vegetable drying oils such as linseed oil; 2. Core oils which harden essentially by polymerization consist primarily of tall oil esters and various petroleum polymers; 3. Synthetic resins, predominately of the urea formaldehyde type, available in either dry powder form or as a dispersion in water.

Very little phenol formaldehyde resin is used as a core binder in aluminum practice (other than in shell molding) because of the high retained strength, which results in a difficult core knockout operation. The urea formaldehyde binders are somewhat higher in initial cost than core oils, but provide operating advantages by reducing baking time and temperature during the casting operation. Cores made with this binder have low retained strength and are easy to knock out.

Materials used to increase the green strength of core mixes include cereal flours, clays and inert fines. Cereal flours produced from corn are the most widely used. Since cereal binders produce considerable gas when

FIRST 100 YEARS: To commemorate its 100th year, Springfield Foundry Co., Indian Orchard, Mass., has designed and produced black, cast iron ashtrays in the shape of a child's porringer and is distributing them to all customers and employees of the firm. Handle includes the company's trademark and the dates 1854-1954

heated during the casting operation, the quantity employed in core mixes should be kept to a minimum consistent with attainment of adequate green strength. Bentonite and inert fines such as silica flour and fly ash are used occasionally to improve the green strength of core mixes. They are desirable ingredients from the standpoint of gas evolution, but have an adverse effect on baked strength properties. Consequently, they should be present in small quantities, and then only when it is permissible to increase the binder content to offset the loss in strength.

The blending of two or more sands is a frequently used method of improving the green strength and sagging resistance of a core mix. The extent to which this procedure can be employed is determined by the amount of additional binder required to maintain baked strength. The question should be resolved on the bases of cost and gas evolution.

A principal point of difference between core practice for aluminum and for the higher melting point metals is the greater need for maintaining core baked strength at relatively low levels. In casting ferrous metals, for example, the higher temperature and greater heat content can result in rapid breakdown of hard, strongly bonded cores. Similar cores in aluminum castings would disintegrate to a lesser extent and would be very costly to remove. It is helpful, therefore, to establish core mixes that provide a baked strength no higher than necessary to resist breakage with reasonably careful handling.

Gating and Risering—As a general rule, aluminum castings should be gated and fed in a manner that permits the metal to solidify progressively in such a way that there always is an adequate supply of molten metal to feed each section as it solidifies. Solidification should start in the sections farthest removed from the point of metal entry and should progress toward the reservoir of hot metal in the risers. The use of chills made of aluminum, copper or cast iron frequently is necessary to control this solidification sequence by hastening the freezing of heavy sections. There also is some use of high conductivity molding mixes to accomplish this result.

Multiple gating frequently is desirable. It has the advantage of permitting lower pouring temperatures, with consequent improvement in the metallurgical structure of the casting. It also reduces the temperature gradient in the casting. Gates should be designed and placed on the casting so that the metal enters the mold with a minimum of agitation and flows in such a manner that portions of the mold cavity are not eroded by the metal stream. The desired quick metal transfer can be accomplished by making certain that the total cross-sectional area in the sprues is smaller than that in the gates; by insuring that the cross-sectional area of the runners is somewhat larger than that in either the sprues or the gates; and by using pouring basins, skim gates, rectangular sprues and trapezoidal runners.

Risers serve as reservoirs of hot molten metal to feed the casting as it solidifies, as exits for mold gases and dross entrapped in the metal and as pressure heads. In addition, they provide a means of reducing temperature gradients within the casting.

Frequently, it is desirable to cut a riser into the side of a casting rather than the top. In such instances, the gate should be cut into the riser, thus providing additional skimming of the metal as it enters the mold and preventing the shrinkage that sometimes occurs where the gate enters the casting.

Cleaning and Finishing—Cleaning and finishing of aluminum castings is relatively simple. The absence of sand burn-in provides a relatively clean and smooth surface after shakeout. If proper core mixes are used, knockout can be accomplished on shakeout machines, with some assistance from a pneumatic hammer. Gates and risers generally are sawed off with band saws and finished with pneumatic chipping hammers. Grinding or filing may be used to remove fins. Some care must be exercised during cleaning operations to prevent breakage, although most castings which become warped, especially in heat treatment, can be straightened.

(Concluded on page 222)

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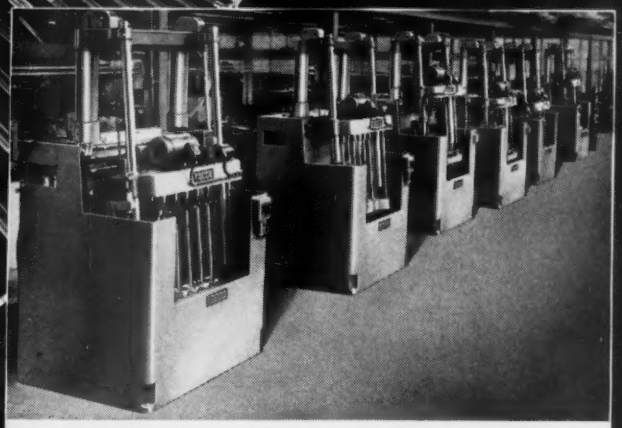

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(*Concluded from page 220*)

Heat Treatment—Heat treatment of certain aluminum casting alloys imparts mechanical properties that are greatly superior to those of the same alloy in the as-cast condition. Consideration of the detailed properties for each of the commercial alloys is beyond the scope of this paper. The various heat treatments merely are summarized.

Annealing, commonly designated T2, usually is carried out at temperatures above 600° F and provides improved ductility and increased dimensional stability over as-cast material.

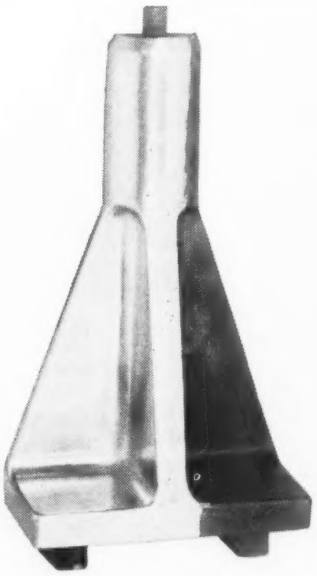
Solution heat treatment, designated T4, consists of prolonged exposure to a temperature only slightly below the melting range and serves to dissolve alloying constituents and to distribute them more uniformly throughout the alloy. Solution heat treatment followed by quenching results in a considerable improvement in the mechanical properties of the castings, particularly the ductility.

Artificial aging treatments can be applied to aluminum alloys in the as-cast condition (T5 type treatment) or after a solution heat treatment (T6 or T7 type treatments). The T5 type treatment provides some increase in tensile strength and hardness over the as-cast condition with a sacrifice in ductility. At higher temperatures, it provides substantial removal of growth and improved dimensional stability. Artificial aging of solution heat-treated material at moderate aging temperatures (less than about 375° F, or T6 type treatment) is employed to obtain higher tensile and yield strength and hardness than by solution heat treatment alone.

Intermediate-temperature artificial aging of solution heat-treated material (T7 type treatment) imparts more aging than is needed to obtain maximum hardness and frequently is referred to as stabilizing. This type of treatment reduces residual stresses resulting from quenching and provides substantial removal of growth, thereby minimizing the possibility of permanent dimensional changes in castings under elevated temperature operating conditions.

Air-chamber furnaces are best suited to the heat treatment of aluminum alloy castings. These furnaces may be heated by electric heating units or radiant tubes, or by gas or oil burners if the harmful products of combustion do not enter the heating chamber. Suitably designed gas furnaces, in which the products of combustion are circulated, can be used satisfactorily if the atmospheres contain a sufficiently high percentage of carbon dioxide and are free of sulphur and excessive moisture.

Design of the furnace should provide a uniform temperature within ± 5° F throughout the working zone. Mechanical circulation of air in the furnace is essential to accomplish the required uniform temperature and to decrease the heating cycle. Baffles within the furnace may be required to eliminate direct radiation and to prevent air from being drawn directly from the heating units onto the castings being treated. Heat-treating furnaces equipped with electrical resistance heating preferably should be provided with units having a low energy input per unit of area.



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Reports Safety Records

Accident records of the foundry and steel industries are reported in a booklet recently published by the National Safety Council, 425 North Michigan Ave., Chicago 11. The booklet, one of 15 devoted to individual industries, contains the 1953 accident experience of all the companies that report to the council. A bar graph shows how each industry stands with respect to 40 industrial classifications.

Automotive Castings

(*Continued from page 87*)

else which will produce a better casting at a lower cost. But America has thrived upon competition. In fact, our higher standard of living, our free enterprise system, all stem from competition. Experience has proved that competition reduces costs, stimulates improvements and new products and brings manifold benefits to the consuming public.

In our industry, competition means harder work and more agressive selling in the future than at any time since 1941. We in the foundry business should welcome the return of competition, provided we are prepared for it. Any foundryman worth his salt is finding the return to normal competitive conditions a worthwhile challenge.

Emphasize Foundry Contributions

Many misleading opinions about the foundry industry and its achievements have been expressed by persons unfamiliar with the industry. Whenever we have the opportunity, we should not hesitate as representatives of the industry, to emphasize the contribution foundries have made to the national economy in the past. It must be our aim to do everything we can to assure that this contribution continues in the future.

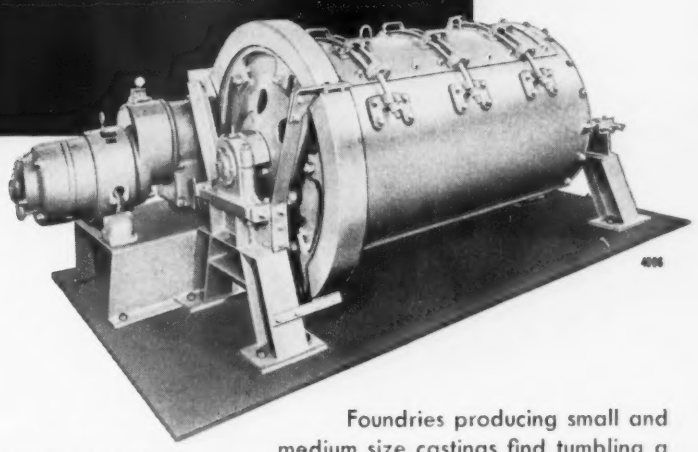
As an illustration of this contribution consider the impact of the foundry industry in the automotive field: In 1953, according to information gathered by the Malleable Founders' Society, 67 per cent of the total production of malleable iron castings produced by member companies was used by the automotive industry. About 80 per cent, approximately 750,000 tons of the total production of all malleable foundries, was produced by Malleable Founders' Society members. Also, approximately 25 per cent of the total production of gray iron was utilized by the automotive field. When you consider the impact of the automotive industry on both ferrous and nonferrous castings, there can be no doubt as to the foundries' future.

Considering the future of any industry requires some long-range planning, a great amount of which revolves around technological advances in engineering and research. It is very significant that we are now experiencing an unprecedented activity in these fields. Technological advances mean the development of new products and the improvement of existing products—both of which benefit the customer. As the forces of a normal competitive market return, we find it not only necessary but desirable to capitalize on technological advances already available and to be alert to new developments which will give customers greater value for their money. To do this will not only require advancement in engineering and research, but will undoubtedly require continued investment in plants and equipment.

Many opportunities exist for foundrymen in the development of new types of metals from which the customer can choose. For example, pearlitic malleable iron has made tremendous strides in recent years in replacing forgings, stampings and weldments. In Central Foundry Division, we increased production of Arma-Steel—our trade name for pearlitic malleable iron—from a few hundred tons in 1938 to over 60,000 tons in 1954. This increase in tonnage is all in new casting applications. The total pearlitic production of Malleable Founders' Society members in 1953 was 68,944 tons. It is my firm conviction, however, that an intensive selling campaign will increase this figure many times. In fact, I see no reason why it should not reach a quarter of a million tons yearly in a

costs tumble with SLY TUMBLING MILLS

Castings cleaned at a fraction of a cent per pound.



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Foundries producing small and medium size castings find tumbling a very low cost cleaning operation.

Frequently, cleaning is done by unskilled labor during an evening shift and after shakeout, using the shakeout gang to load and unload the mills. Among the wide variety of castings being tumbled are agricultural machinery parts, brake shoes, motor bell ends, soil pipe and fittings, also automotive brake pedals, manifolds, transmission cases, flywheels, pump housings, etc., fragile castings, deep core castings.

Let's talk over your castings cleaning situation.

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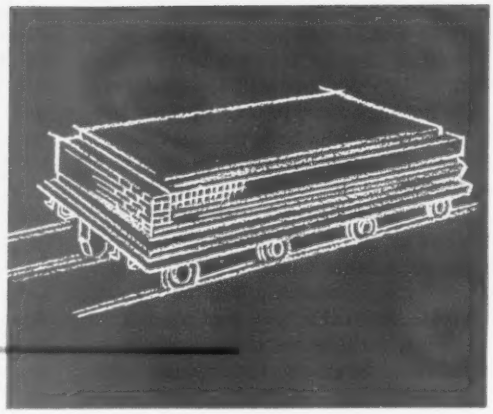

Car-type furnaces solve the problem of heat treating large, awkward-to-handle stock—or large quantities of parts which together form a bulky, heavy load.

Furnaces of this type can be either batch or continuous. In the first case, the load is rolled into the furnace and left there until the heat treat cycle is completed. When several cars are placed in line—the last one added pushing the row of cars through the furnace zones—the operation is continuous.

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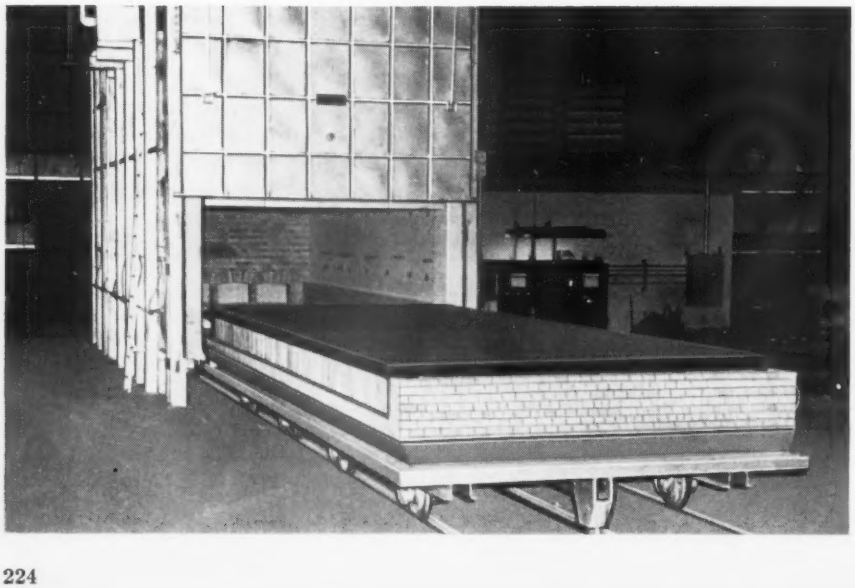

short time. Its many desirable mechanical properties and the economies resulting from the processing of the finished casting, have given and will continue to give this material a prominent place in the selection of parts for use in the automotive industry.

In the area of new metals, indications are that the use of nodular iron is progressing at a rapid rate. We are aware of the problems of producing this type of iron, but as the methods of manufacture are better controlled, uses for this material will expand and the demand will increase.

Another iron which appears to have a bright future is calcium-carbide-treated gray iron. This low-sulphur iron possesses high mechanical properties with a lower brinell hardness than is attainable with regular cupola iron. The treatment of regular cupola iron by the calcium carbide process is also referred to as "upgrading." With this process, it is possible to produce a high test gray iron at a low cost.

So far, we have been discussing the development in the ferrous field. Automotive engineers, however, have shown considerable interest in the use of aluminum castings to replace gray iron, malleable iron and in some cases even forgings. Some of this interest stems from the adequate supply and favorable price trend of basic material at this time. Also, its machinability, the saving in weight and the reduction of vehicle operating costs have opened the way for major design changes. In some cases, engineers will pay a premium for an aluminum casting where it might be advantageous to use a lighter part.

In the past, steel castings have not been used to any great extent in the automotive industry; however, the advent of new processes, such as shell molding and its improved casting tolerances, certainly enables steel castings to compete with forgings in the automotive industry.

"Sure, I'm wearing safety shoes—I just cut off those heavy steel toes, is all."

Many of you may recall that at the AFS convention in Chicago in May, 1953, I discussed the development of producing molds by the shell process. I stated at that time that I considered the shell process one of the greatest technical developments of our time in the foundry industry. That was about 18 months ago, and today I feel more certain than ever. In Central Foundry Division, we are using the shell mold process in all three of our plants, and we believe the time is not too far away when most small castings will be produced more economically by the shell mold process than with conventional green sand molding.

Producing shell molds faster and better is the aim of the foundryman using this process. The commonly used dump-box method of producing shell molds rapidly is being supplanted by blowing of shell mold and cores in a manner similar to the conventional method of blowing cores. The rate of production using the conventional dump-box method is from 30 to 40 shells per hour per machine. A new machine has been developed by our division, in co-operation with the General Motors Research Laboratories Division, which is capable of producing 120 shell molds per hour. A couple of these machines now are being built, the first of which will be in production in approximately three months.

Establishing Closer Liaison

An important aid in furthering the use of castings in the automotive industry is the trend toward a closer liaison between foundry and automotive engineers. Such liaison enables the foundry engineer to offer suggestions in the design of the particular part which make it possible to produce a sound casting at the lowest possible cost.

We cannot stress too highly that control of the quality of the product has a major influence on the future of the casting industry. It would be very shortsighted for any foundryman not to exert every precaution and utilize every opportunity to produce a satisfactory product.

Unlike the manufacturer of consumer goods who uses the medium of advertising and user-satisfaction to stimulate sales, ours is an industry which must stimulate sales by a constant effort to point out new applications for castings in the manufacturer's products. For example, foundry engineers working together with automotive engineers brought about the application of castings for automatic transmission and power steering units. Public demand for these conveniences has resulted in increased tonnage of castings.

In recent years, the automotive

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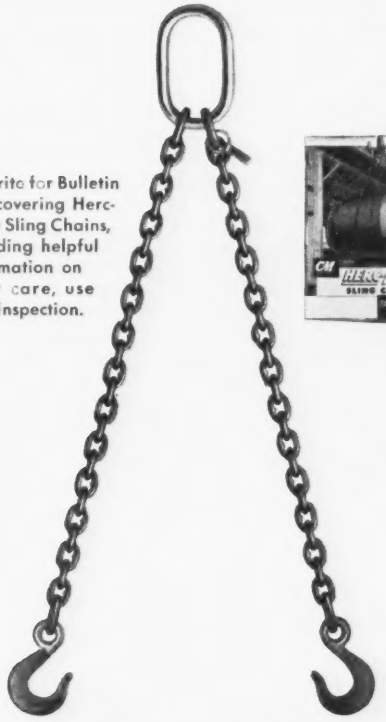

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camshaft has been a steel forging in many automobiles. The trend today definitely is toward a casting for this part. The automotive engineer long has recognized the good qualities of the cast camshaft, but the foundry industry had a difficult time convincing automobile executives of the savings involved, particularly when the automobile companies had forging operations of their own.

The automotive crankshaft is another example of an application for which a casting is gaining in popularity over a forging. This has been due principally to the development of the new overhead valve V-8 engines in which a much shorter crankshaft can be used than in the former straight-8 engines. I am sure that you can appreciate what such a conversion to castings will mean in additional tonnage to the foundry industry.

Another reason for my optimism about the future of the casting industry is that the educational phases of the business are in sound hands and are receiving the attention of the leaders of the foundry industry.

Each year, we employ many graduates from various engineering schools throughout the country, graduates who with few exceptions have a very meager knowledge of casting and casting design. Although some improvement in the educational phase has been made, there still is much to be accomplished. No doubt you all have heard discussions about instilling a better understanding of casting in our engineering students. If we are to continue our progress, it is imperative that young technical men entering the engineering departments of the automobile and related industries receive the proper knowledge of the use and properties of castings.

The Foundry Educational Foundation is tackling the educational problem aggressively. Manned by executives from the foundry industry, the foundation knows the problems and the demands for trained personnel. These men are doing a fine job through periodic meetings and discussion of the problem of furnishing more and better trained men for the foundry industry. Trained personnel is important because it has been said of any industry that there are four basic factors—material, methods, machines and men. The most valuable, of course, is men, for if we retain our men, our management organization can regain losses in the other M's.

I think this point was very dramatically illustrated in the disastrous Detroit transmission plant fire, when trained personnel from the entire General Motors organization was able to restore production within a very short time, in spite of total loss of plant, machines and equipment.

Technical developments in the foundry industry also are in very capable hands. Each metals division of the American Foundryman's Society is sponsoring research projects under the direction of its best technical men. The future of each of these branches of the casting industry ap-

3 Kinds of "Best"

The best non-ferrous castings are usually those poured at correct temperature. Whether of brass, aluminum or magnesium, castings poured at the right heat are likely to be sound, dense and strong.

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pears very promising. Projects of this nature have a great effect on the continued progress of the foundry.

The foundry industry cannot stand still—the development of new materials, methods processes and facilities all have strengthened my faith in the future of this industry. Traditionally, the foundryman has been adept in finding ways to do the difficult job today, the impossible one tomorrow. It is this philosophy that will insure a bright future for the use of castings in the automobile industry.

GIFS Publishes Manual On Accounting

Advanced cost accounting methods are explained in a manual issued by the Gray Iron Founders' Society Inc. The types of foundries that can best use the various methods are mentioned. The new publication, "Cost Manual No. 2, Advanced Cost Accounting Methods for Gray Iron Foundries," is the result of two years of work, meetings and studied evaluation by the Society's Cost Committee.

Chairman of the cost committee is A. E. Hageboeck, Frank Foundries Corp., Moline, Ill.; co-chairman is C. R. Culling, Carondelet Foundry Co., St. Louis. Other members of the committee are H. L. Edinger, Barnett Foundry & Machine Co., Irvington, N. J., R. T. Lewis, Keen Foundry Co., Griffith, Ind., and J. E. McIntyre, Sibley Machine & Foundry Corp., South Bend, Ind.

The book, which includes "Cost Manual No. 1," may be obtained from the Gray Iron Founders' Society Inc., National City East 6th Bldg., Cleveland 14, O. The price to members is $5; to nonmembers, it is $15.

Alloy Specifications Listed in Book

Recently issued 345-page book entitled "Cross-index of Chemically Equivalent Specifications and Identification Code (Ferrous and Nonferrous Alloys)", and further identified as *Supply and Logistics Handbook H 1A*, is available from the U. S. Government Printing Office, Washington 25, for $1.75.

In this book, ferrous and nonferrous alloys of similar composition covered by various specifications are given 5-digit code numbers to facilitate compilation of raw material requirements in bill of materials reporting; also to provide a reference whereby material compositions of various specifications may be compared, and to provide a means for military reporting and planning agencies to consolidate and evaluate material requirements by machine methods.

Specifications of various agencies identified by initials include those of U. S. Army, Aeronautical Standards Group, U. S. Air Force, General Services Administration, American Iron and Steel Institute, Department of Defense, Aeronautical Material Specifications, U. S. Navy, Aluminum Producers, Society of Automotive Engineers, and American Society for Testing Materials.

Book is divided into three parts of which the first lists code number, specification number or symbol, form or shape of material, initial designating specification agency, and detailed chemical composition. Second part lists separately specifications issued by the various agencies with designation, code number and complete title. Third part lists code numbers in numerical order with nominal composition and common industrial name of each material.

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GRAY CAST IRON IS PRINCIPAL TOPIC

At International Foundry Congress Technical Sessions

By VINCENT DELPORT
European Manager

FIFTY-FIVE papers were presented at technical sessions of the International Foundry Congress held recently in Florence, Italy. About twenty of these dealt with subjects related to gray cast iron.

The French exchange paper, **Grain Size in Cast Iron,** was by M. Ferry and J. C. Margerie, Centre Technique de Fonderie, Paris. The authors endeavored to find a relation between the fineness of the grain of cast irons having a nearly eutectic composition and the cooling conditions and the law of solidification of the metal in the mold. They found that the only characteristic influencing solidification was the length of the curve representing the eutectic condition.

In the Belgian exchange paper, Prof. A. de Sy, University of Ghent; Dr. J. Vidts, research director, University of Ghent laboratories, and J. Van Eegham, foundry research center, discussed **The Mechanism of the Ferritization of Gray Iron and a Study of Its Retardation by Sn and Cu.** They concluded that the obstruction by Sn and Cu of the austenitic layer near the gamma-alpha interface holds back direct ferritization.

The Swedish exchange paper, by J. Drachmann, AB Centrifulgalror, Oxelosund, was entitled **The Sulphur Index S_s (sulphur in the slag) Over S_i (sulphur in the iron) As a Function of the Components of the Slag in a Cupola.** The author's main conclusion is that the basicity index gives a sufficiently good measure of the influence of the slag composition on the sulphur index.

A Spanish exchange paper by J. N. Alcacer and J. A. J. de Andres, foundry section, Spanish Iron and Steel Institute, discussed **A Functional Curve for the Study of Cupola Combustion,** in relation to depth of the coke layer.

A paper by M. Barbero and D. Fortino, Fiat Co., Turin, was on **Determining Factors on the Microstructure of Gates and Risers in Gray Iron Castings.** The authors studied the effects of inoculants, especially amorphous graphite, with a view to eliminating certain structural defects of castings and improving casting quality.

In a paper entitled **Systematic Suppression of the Formation of Eutectoid Ferrite,** Prof. A. de Sy and J. Foulon, Research Center of Ghent, studied the possibility of obtaining a 100 per cent pearlitic matrix, without traces of free carbides, starting from a nodular iron giving from 70 to 90 per cent free ferrite cast in bars 20 mm in diam. They found that a small addition of copper or traces of Sn were sufficient to prevent the formation of ferrite around the graphite nodules.

V. Montoro, Electrochemical Polytechnic Institute, Milan, in a paper on **Changes in the Oxidation Regime of Iron and Iron Castings,** described a modification of the regime of oxidation which arises at the isotherms of iron at 920° C.

M. Ferry, Mlle. G. Aubrion and J. C. Margerie, Centre Technique des Industries de la Fonderie, Paris, contributed a paper on **The Mechanism of Solidification and Segregations in Phosphorous Cast Irons.** Among other conclusions, they show that a homogenizing treatment has little effect on the elimination of phosphorus eutectic segregation during solidification.

Graphitization Anomalies and Inverse Tempering in Cast Iron Piston Rings, was the title of a paper by P. Gallinaro, Italian Register of Aeronautics, Turin. The author concludes that these anomalies can be attributed to the absorption of hydrogen and that only specially equipped laboratories can help to resolve the problem.

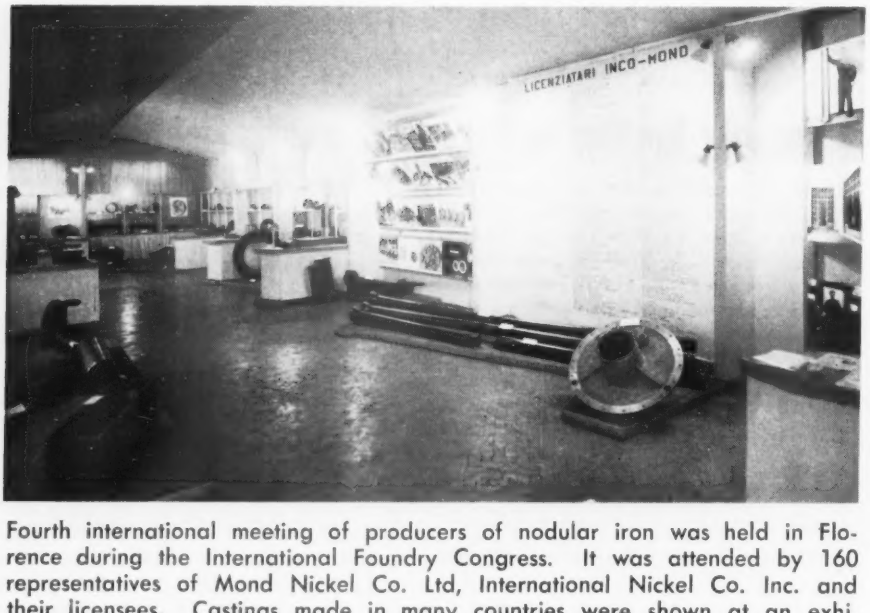
G. Bartolani, W. Demicheli and C. Longaretti, Finsider Iron and Steel Institute, Genoa, contributed a paper on **Production of Ingot Molds in a Basic Cupola from Charges of Various Composition,** in which they concluded that the chemical and physical properties of basic iron were at least equal to those of acid irons and that the basic lined cupola was more advantageous from the economic point of view.

S. Tunder, Gesellschaft fur Huttenwerksanlagen, m.b.H., Dusseldorf, contributed a paper on **The Continuous Hot Blast Basic Cupola,** giving operational data on this type of melting furnace.

In a paper entitled **Oxidizing and Reducing Atmosphere in Cupolas,** G. Tarocchi, Fonderia Fargas, Milan, stated that the use of methane will increase, under controlled atmospheric conditions, and will give more hydrogen and CO for the reduction of iron oxides. Oxidizing or reducing atmosphere can be used in a cupola, and the choice depends on the type of iron required.

A. Wittmoser, Versuchsanstalt der Eisenwerke, Gelsenkirchen A.G., in a paper on **The Systematic Classification of Cast Iron,** stated that a) malleable iron is obtained by the decomposition of the cementite of white

(*Continued on page* 230)



Fourth international meeting of producers of nodular iron was held in Florence during the International Foundry Congress. It was attended by 160 representatives of Mond Nickel Co. Ltd, International Nickel Co. Inc. and their licensees. Castings made in many countries were shown at an exhibition held in conjunction with the congress. Among U. S. firms showing exhibits were Prospect Foundry, Beloit Foundry Co., Koppers Co., Morris Bean & Co., Fairbanks Morse & Co., International Harvester Co., Jamestown Malleable Corp., Taylor & Fenn Co., Washington Mold Machine & Foundry Co.

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A close-up view of alloying Molybdenum additions entering the molten metal.

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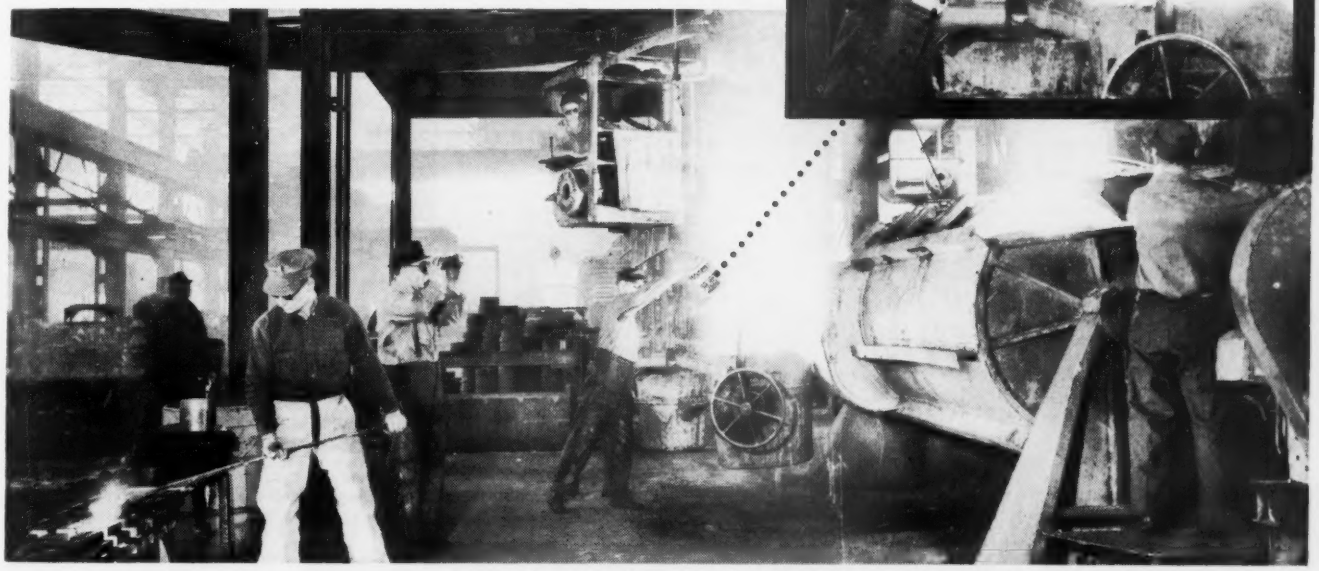

A section of a Caterpillar foundry in operation, showing pouring chill test, temperature reading by optical pyrometer, alloy additions and taking a test of molten iron.

Acknowledged the world's largest earth-moving equipment manufacturer, Caterpillar Tractor Co. has long recognized the importance of MCA Molybdenum additions for strength and safety in castings for pistons, piston rings, crank shafts and cylinder heads.

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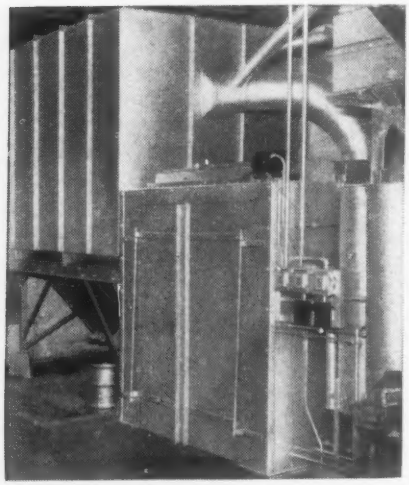

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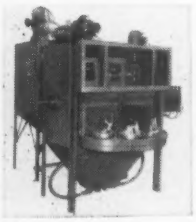

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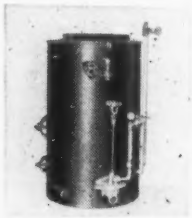

BLAST CLEANING MACHINES

The Macleod Type "H" Blast Cleaning Machine (at left), available in both portable and stationary models. Along with low cost operation, it features low initial cost and superior blasting efficiency. Macleod offers an extensive line of Blast Cleaning Machines—portable and stationary, for floor level or pit installation, and in semi-automatic and fully-automatic, continuous cycle models.

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(*Continued from page* 228)

cast iron through adequate heat treatment, irrespective of the form of the graphite; b) gray cast iron is formed irrespective of conditions of solidification, melting conditions or form of graphite. He recommended closer co-operation between the various branches of the ferrous foundry industry.

In **New Proposal for the Standardization of Gray Cast Iron,** Dr. A. Collaud, Gesellschaft der Ludw. von Roll'schen Eisenwerke A.G., Klus, Switzerland, asked two questions: a) Is the tensile test on the 30-mm test bar a criterion permitting the classification of gray irons? b) Is it possible to deduce characteristics in service from the 30-mm test bar separately cast? In most cases the answer is in the negative, but Mr. Collaud said that the properties of gray iron can be deduced from a bi-variant graph in which co-ordinates are the brinell hardness and the physico-chemical composition, expressed in degrees of eutectic composition. Tensile values, according to the Swiss standards, go from 1.5 to 5 kg per sq mm, and castings are classified in five categories of thickness in regard to cooling conditions. A further study of certain characteristics that can be linked up with the bi-variant diagram is being made and will be the subject of another paper.

V. Montoso, E. Lossa, and A. and E. Giussani, Electrochemical Polytechnic Institute, Milan, discussed **Structural Modifications of Gray Iron in Enameling Processes,** as examined through micrographic observations.

In a paper on **The Formation of Iron Oxide Films on Molten Iron,** R. Merz and B. Marinek, Zurich, showed that temperature control is the important factor in avoiding the formation of iron oxide film.

Comparison Trials Between Ingot Molds Produced by the Acid-Lined and the Basic-Lined Cupola, was the subject of a paper by G. Bortolani, W. Demicheli and C. Longaretti, Finsider Iron and Steel Institute, Genoa, in which the authors concluded that the basic-lined cupola gives the best results.

Six papers dealing with nodular iron were presented.

The German exchange paper, by H. Timmerbeil, Knorr-Bremse G.m. b.H., Volsmarstein-Ruhr, was **Thermal Stability of Spheroidal Graphite Irons.** The author relates experiments with an iron which contained 6.44 per cent silicon and only 0.01 per cent of combined carbon and possessed a tensile strength of 50,000 psi. The addition of nickel augments thermal stability. The iron with 6.44 per cent silicon can be ma-

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chined, despite a brinell hardness of 328.

J. Grilliat, Conservatoire National des Arts et Metiers, Paris, gave a paper on **A Study of Some Austenitic Spheroidal Graphite Irons.** The author's conclusions were: a) austenitic irons similar to Ni-Resist can be obtained with spheroidal graphite if the copper content is no more than 4 to 5 per cent and chromium no more than 1.5 per cent. b) The mechanical properties of spheroidal graphite austenitic irons are superior to those of corresponding flake graphite iron and can be improved still further by heat treatment. c) Resistance to corrosion is about the same in both irons. d) Resistance to oxidation at high temperature is greater with nodular iron.

The results of tensile and impact tests on nodular iron test bars were given by C. Galetto, Center of Information on Nickel, and C. Pogatsshnig, Fonderie Acciaierie Milanese Vanzetti, Milan, in a paper entitled **Mechanical Properties of Spheroidal Graphite Irons Produced in Italy, with Special Reference to Impact Values.** The impact test results on notched bars are influenced by the presence of ferrite in the matrix, but the test on Mesnager test bars in the annealed state shows the capacity of nodular iron to absorb work applied by impact.

In **The Importance of the Elastic Properties of Spheroidal Graphite Iron Used in the Engineering Industry,** C. Gianola, S.A.F.I.I. de Bartolomeis, Milan, demonstrated that elastic properties of heat treated nodular iron are superior to those of carbon steel, or even to those of some alloy steels, and that nodular iron is a suitable engineering material, notwithstanding its low impact strength, limited elongation and area reduction properties.

A de Sterke, Technische Pienst N.V., Overshie, and A. Bordes, Y. B. Ubbing & Co. N.V., Doesburg, the Netherlands, contributed a paper on **Experiments with Ultrasonics on Spheroidal Graphite Iron Test Pieces.** Ultrasonic tests were made on defective test pieces and compared with similar pieces cast as sound as possible. The tests were made in the rough state, after heat treatment and machining. This form of test was found of interest, but further research is necessary, especially on the measurement of the size of flaws.

Cause and Suppression of the Formation of Rim Pearlite in Black Heart Malleable was contributed by A. Bordes, B. Ubbing & Co. N. V., Doesburg, the Netherlands. The

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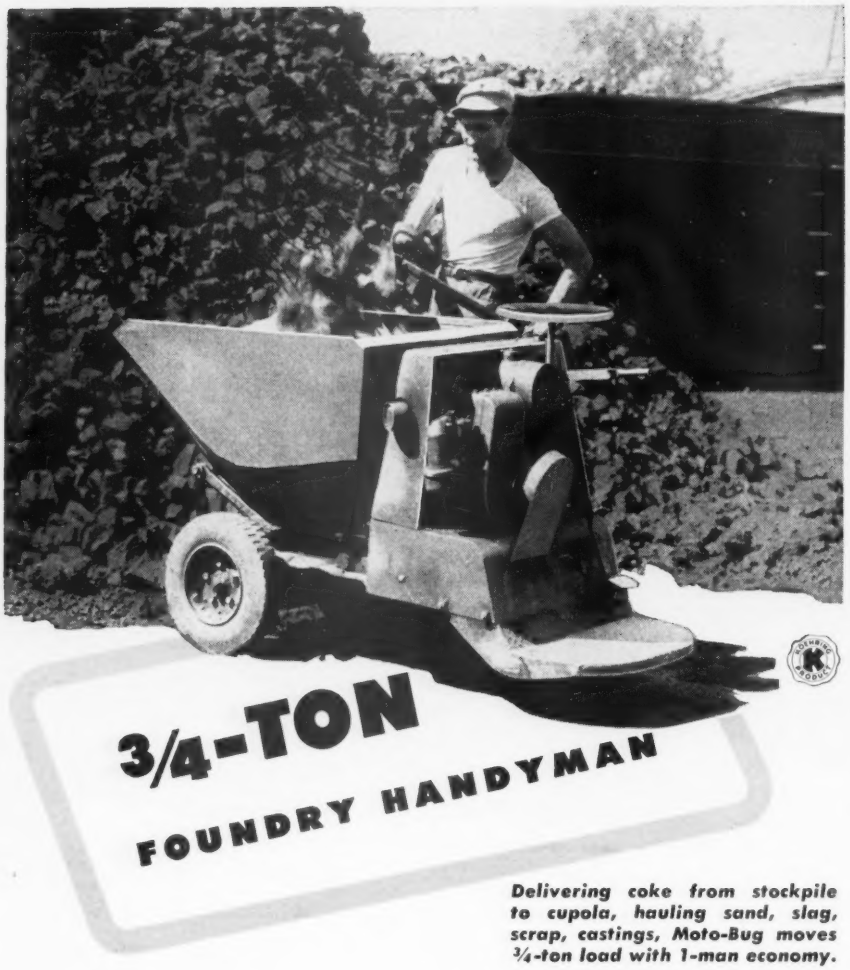

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author stated that formation of the pearlitic rim is due to the influence of the materials in contact with the surface of the casting, by penetration of certain elements, especially oxygen, but also sulphur and hydrogen. He recommends decarburizing the rim zone by slight oxidation after temper carbon has been formed and conducting the annealing process accordingly.

Steel castings were the subject of three papers. Sten H. C. Forslund, Avesta Jernverks AB., Avesta, Sweden, contributed a paper on **The Layer Method of Determining Pouring Rate and Mold Orientation in Casting. Steel.** The author described a method of graphical representation of the regions of the mold where cold shuts may occur. Mold volumes in horizontal layers are calculated and plotted against the height of the mold, and the resulting curve enables the pouring rate to be calculated for the various layers. Bottom pouring is used. The method also helps to find the best orientation of the mold for obtaining the optimum flow of metal.

Homogenization of Cast and Forged Steel Parts was the title of a paper by A. Hencks, Acieries Electriques de l'Arbed-Dommeldange, Luxemburg. The author found that homogenization treatment improves ductility and tensile strength, and he stated that the extra cost of the treatment was justified.

V. Socci, S.I.A.C., S.p.A., Genoa, described methods used to increase production and productivity in an Italian steel foundry in **Modernization of a Steel Foundry.**

Papers on nonferrous practice included one by P. J. Le Thomas, in charge of the nonferrous division, Centre Technique de Fonderie, Paris. The title was **Relationship between the Structure and the Tensile Properties of Sand-Cast Bronze Containing Tin.** Such a relationship has been established and has been corroborated by tensile tests made on 400 test pieces of phosphor bronze coming from an earlier investigation.

Another paper, by Y. Tostmann, Demag Elektro-Metallurgie G.m.b.H., Karlsruhe-Duisburg, and G. Conti, Siemens S.p.A., Milan was **Zinc and Copper Cathodes in Large Electric Furnaces.** The authors described the results of operation of induction furnaces for melting zinc and of arc furnaces for melting copper used as cathodes, as employed in Italy and other countries.

There were five papers on light alloy castings. The Dutch exchange paper, by L.J.G. Van Ewijk, Industrie Vaassen, was on **Heat Treat-**

ment of Al-Mg Alloys. The results of tests made at the author's works showed that the physical and mechanical properties of the Al-Mg alloy known as Hydronalium improve as the grain becomes finer, but that it is difficult to avoid precipitation of a brittle constituent in medium sized pieces during the heat treatment.

The Influence of Fe and Mn on Alloys of the Alpax Type was the title of a paper by Claude Mascre, in charge of the light alloy division, Centre Technique de Fonderie, Paris. A formula was established giving the proportion of Mn to be added to an A-S 13 alloy containing iron in order to obtain the best properties. From the results, it is possible to state the extent to which the A-S 13 alloy containing iron can be used in foundry practice and the precautions which should be taken when such an alloy is used.

U. Gandolfi and D. Gualandi, Light Alloy Institute, Novarra, presented **Study of the Structural Variations Produced by Phosphorus in Complex Hypereutectic and Heat Resisting Alloys of Al, Si, Ni, Cu and Mg.** Such alloys are used for casting pistons for internal combustion engines.

A paper on **Gamma Ray Examination of Light Alloy Castings with the Radioisotope Thullium 70** was contributed by A. Blondel and P. Broquet, Centre Technique de Fonderie, Paris. The authors showed the possibilities of using thullium 70 as a source in gamma ray examination.

Papers on molding practice included one on **Old and New Methods of Molding,** by F. Grosser, Buderus'sche Eisenwerke, Wetzlar, Germany. An Indian official exchange paper was presented by R. M. Krishnan and B. R. Nijhawan, National Metallurgical Laboratory, Jamshedpur. The subject was **Indian "Bihar" Bentonites and their Scope as Molding Sands.**

H. J. Meerkamp van Embden, Philips Laboratories, Eindhoven, the Netherlands, described **New Possibilities Offered by Precision Casting.** The author told how the lost wax investment process could be used with new alloys and in new ways.

The official exchange paper from the Institute of British Foundrymen was by J. M. Langham, J. Stone & Co. (Charlton), London. The subject was **The Manufacture of Marine Propellers with Particular Reference to the Foundry.** This contribution was based on the foundry technique developed by the author's company.

R. Namur, Fabrique Nationale d'Armes de Guerre, Herstal, Bel-

Ideal for use in foundries and small metal producing plants, these machines provide exceptional economy and durability due to a unique design feature. The endless chain carrying the mounds runs over a series of "stationary wheels" mounted on the frame, rather than in the chain as on conventional units. This keeps the wheels as far as possible from the hot metal and eliminates 80% of the moving parts. Results are increased capacity and a substantial reduction in maintenance and operating costs. Capacities: 3 to 50 tons per hour. Lengths: 15 to 125 feet, in multiples of 5 feet.

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Gamma rays.....
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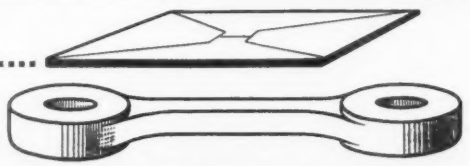
steel casting.....

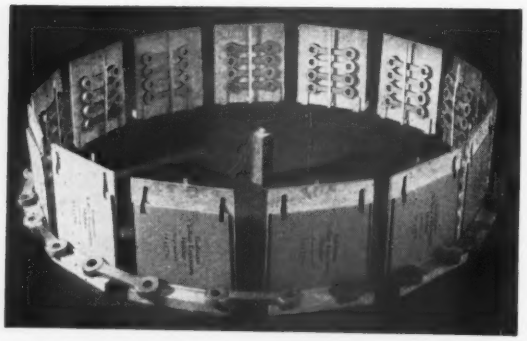


RADIUM RADIOGRAPHY

improves foundry practice and production

Compared with X-ray radiography, radium radiography is new, but its peculiar advantages have been finding increasing favor with steel foundries. The first commercial radiograph with radium was made in 1930—and by 1950 250 steel foundries throughout the country were using radium radiography. The constant activity of radium, the even dispersion of its rays with a minimum of scattering; the portability of the equipment and simplicity of operation all combine to make radium radiography an economical nondestructive method of testing. Write today for case histories and additional information. *Your requirements promptly supplied.*

Illustration shows 60 steel castings being photographed simultaneously. The gamma rays, flying in all directions, go through all the castings at once, making 60 exposures of the 60 castings



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WILTON TOOL MFG. CO., INC. F-1

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gium, gave a paper on **Heading and Risering of Sand Castings.** The author proposed a formula for calculating heads and risers to feed sand castings. He claims that this method is practical and can be used in the drawing office.

Dr. G. Somigli contributed a paper on **Manufacture and Properties of Refractory Crucibles Used in the Foundry.** Suggestions were given to help the user to use crucibles in such a manner as to ensure the longest possible life for them.

E. Calamari described **A New Industrial Frequency Induction Furnace for Melting Ferrous Alloys.** This new type of furnace, working on industrial frequencies, on the so-called secondary oscillating channel, is claimed to do away with the difficulties encountered in ferrous melting with the type of furnace used with success for nonferrous metals. He gave a table of comparison which showed the advantages of this furnace as compared with other types of electric furnaces.

A paper describing **Some Methods for Casting Anisotropic Permanent Magnets from an Iron-Cobalt Nickel-Aluminum Base** was by A. J. J. Koch and K. J. de Vos, Philips Lamp Factory, Eindhoven, the Netherlands. The authors compared methods of casting the specified alloy in green sand molds, with either natural or synthetic sand, in permanent molds, in shell molds and in hot molds. It is claimed that the selection of the sand is wider with shell molds. The authors also outlined methods for obtaining crystal orientation when it is required.

V. Montoro, Milan, dealt with **The Mass Effect in the Enameling of Iron Castings.** This effect is mainly one of oxidation.

G. Marilli, Nuovo Pignone S.p.A., Florence, gave a paper on **A Classification of the Causes of Foundry Defects and a Statistical Analysis for Reducing Rejects in the Foundry.** It is claimed that the system of classification and analysis established in the author's foundry reduced rejections from 6 to 3 per cent. The paper also contains a list of measures taken to eliminate the causes of defects.

J. S. Abcouver and C. A. M. van der Linden, Werkspoor N.V., Amsterdam, gave a further study on **Heat Transfer Between Mold and Metal in Sand Molds.** An endeavor is being made to find a practical mathematical calculation of heat transfer from mold to the metal and a curve of temperature which can be used currently in research organizations.

Preliminary Notes on Foundry

Coke Standardization was contributed by E. Ferrara and I. Meltzer, Vetrocoke S.p.A., Turin. According to the authors, the main qualifications are uniformity of size, high strength, low porosity, low reactivity, high calorific value and low content of the type of sulphur that can be picked up easily by the iron.

Other papers presented include the following:

G. Cola, Termomeccanica Italiana, La Spezzia, **The Influence of Graphitic Segregation on the Damping Properties of Cast Iron.**

H. Schiffers, Technical High School, Aachen, Germany, **Mechanism of Combustion in Cupolas, with Reference to Oxygen Consumption.**

E. Bertram, W. Patterson and R. Jummerle, Giesserei Institut, Technical High School, Aachen, **The Influence of Si, Cu, Zn and Mg on Hot Cracking on the Capacity of Filling the Mold and on the Strength Properties of the Standardized alloy G Al Si_5 Cu_3.**

F. Poelzguter, Deutsche Edelstahlwerke, Bochum, Germany, **The Importance of Shell Molding Processes according to Croning in the Modern Foundry.**

P. Tincolini, Faculty of Architecture, Florence, **The Effects of the Rationalization of Raw Materials Stockyards and of Mechanical Handling on Production Costs in a Medium Sized Foundry.**

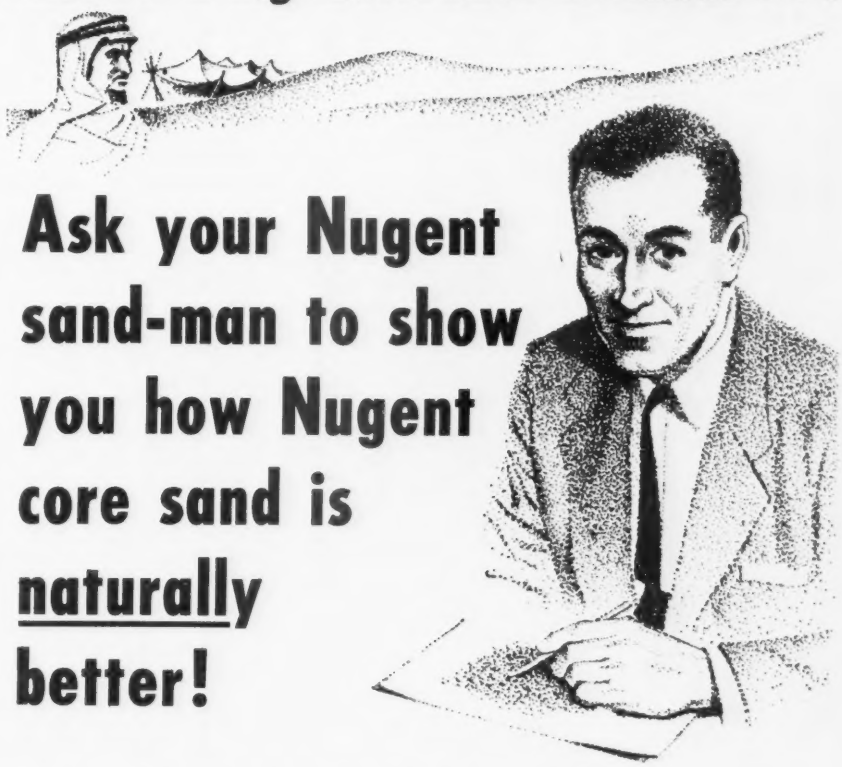
L. Frede, Verein Deutscher Giessereifachleute, **The Importance of Experiments in Technical Foundry Training.**

Parow-Souchon, Dusseldorf, Germany, **Ultrasonic Testing Applied to the Foundry.**

Small Business Finances Discussed in Handbook

Written to furnish inexperienced managers with basic information of the financial operation of business and to aid them in making use of available financial services, "A Handbook of Small Business Finance" states that inexperienced management is often more harmful than a lack of financial resources. Included in the handbook written by Ralph B. Tower, professor of economics and finance at West Virginia University, are chapters on financial statements, financial management, turnover rates, banking relationships and lending programs. The booklet is published by the Small Business Administration as No. 15 in its management series. It is available from the Superintendent of Documents, Washington 25, D. C. for 30 cents a copy.

There's a big difference in sands . . .



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Put samples of Nugent sand to the test in your sand lab — you'll *see* why it's naturally better! Nugent sand is processed from the best Muskegon dune sand, washed pure by nature for centuries . . . kiln-dried to the correct moisture content, then graded to a uniform AFS grain analysis. This means less core breakage, consistently uniform molds, greater pattern definition and finish, plus freedom from defect-producing components.

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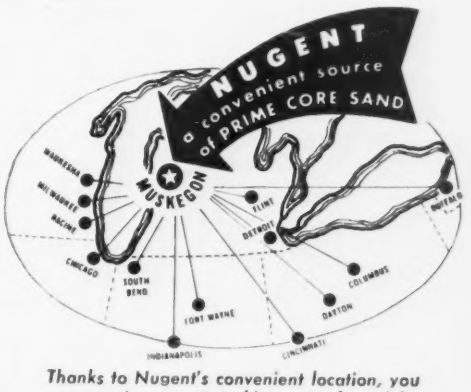

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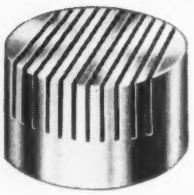
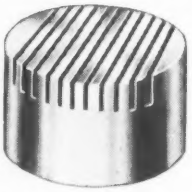
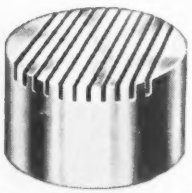


X-TRA DEEP HEAD .156 Wide Slots .014

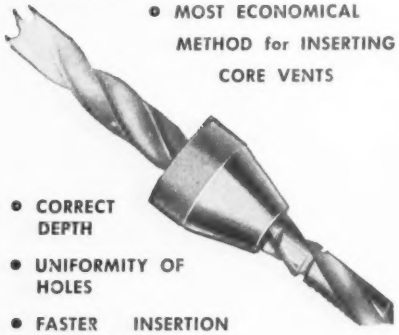


DEEP HEAD .093 Wide or Narrow Slots .014 .010



SHALLOW HEAD .031 Wire or Narrow Slots .014 .010

INSERTING DRILL



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TRADE PUBLICATIONS

For more details on these items use reply card— page 199

LOW-TEMPERATURE ALLOYS: Cerro de Pasco Corp., 40 Wall St., New York 5, N. Y.—Revised booklet describes the use of low-temperature-melting alloys in the making of matchplates, metallizing wood pattern equipment and in the repair and alteration of patterns and core-boxes.

For More Details Circle No. 141—Page 199

OIL - RETAINING BEARINGS: Bound Brook Oil-less Bearing Co., Bound Brook, N. J.—Widely used sizes of oil-retaining porous bronze bearings are listed by size in stock list No. 4. Also provided is condensed information on application, installation, lubrication and machining.

For More Details Circle No. 142—Page 199

AIR TRAPS: Armstrong Machine Works, Three Rivers, Mich.—Bulletin 2022 describes the methods of selecting and installing air traps for automatic drainage of water from compressed air units. Detail drawings, physical data and list prices of ball float, inverted bucket and snap-action air traps are included.

For More Details Circle No. 143—Page 199

BLAST CLEANING: American Wheelabrator & Equipment Corp., 955 South Byrkit St., Mishawaka, Ind.—Quarterly bulletin, *Wheelabrator Tips*, gives hints and discussions on better operating methods and maintenance for customers using airless blast cleaning equipment.

For More Details Circle No. 144—Page 199

FLEXIBLE PATTERNS: Thiokol Chemical Corp., 780 North Clinton Ave., Trenton 7, N. J.—Formulations and properties of cold casting compounds based on a liquid polymer, used in making flexible molds and patterns, are given in bulletin 115.

For More Details Circle No. 145—Page 199

LIFTING MAGNET: Ohio Electric Mfg. Co., 5400 Dunham Rd., Maple Heights, Cleveland, O.—Performance data, specifications and dimensions of a battery-operated portable lifting magnet available in 2000 and 4000-lb models are given in catalog 113.

For More Details Circle No. 146—Page 199

MATERIALS HANDLING: Kwik-Mix Co., Milwaukee 16, Wis.—One-man materials handling trucks are illustrated in folder. A flatbed truck, a hopper truck and a fork lift truck are shown in foundry applications.

For More Details Circle No. 147—Page 199

MOTOR STARTERS: General Electric Co., Schenectady 5, N. Y.—Information on alternating current magnetic motor starters (1/6 to 50 hp), alternating current combination starters (½ to 25 hp), push button stations, alternating current manual motors, and magnetic reversing controllers is contained in bulletin GEA-6061.

For More Details Circle No. 148—Page 199

TRUCK PROCUREMENT PLAN: Lewis-Shepard, Department R-64, Watertown, Mass.—Circular SP-1036 announces six ways to procure industrial trucks. Plans available include a lease program, time payment plan, short-term rental plan, purchase, truck trial plan and a trade-in program.

For More Details Circle No. 149—Page 199

PYROMETRY NOTES: Tempil Corp,. 132 West 22nd St., New York 11, N. Y.—Topics covered in bulletin include thermocouple accuracy, contact pyrometers, temperature equilibrium, radiation pyrometers and surface-temperature signals of a chemical nature.

For More Details Circle No. 150—Page 199

STAINLESSS CASTINGS: Cooper Alloy Corp., Hillside, N. J.—October 1954 issue of *Newscast*, a technical periodical dealing with stainless steel castings, valves and fittings, contains articles on new alloys, design, shell molding and a chart of alloy properties.

For More Details Circle No. 151—Page 199

SPECTROGRAPH: Jarrell-Ash Co., 26 Farwell St., Newtonville, Mass.—Plane grating spectrograph with order sorter is explained in catalog EB-10-54. Reproductions of several typical spectra illustrate the performance characteristics of the instrument.

For More Details Circle No. 152—Page 199

CRANE CONTROL: Harnischfeger Corp., Overhead Crane Division, 4613 West National Ave., Milwaukee 46, Wis.—Bulletin C-50 covers all aspects of a magnet-torque unit for crane control. All types of crane controls are reviewed.

For More Details Circle No. 153—Page 199

CENTRIFUGAL BLOWERS: Power Engineering Co., 205 West Wacker Dr., Chicago 6, Ill.—Blowers and gas boosters are listed in a booklet. Included is a cupola blower selection table.

For More Details Circle No. 154—Page 199

LADLE DRYING: Hauck Mfg. Co., 124-136 Tenth St., Brooklyn 15, N. Y.—Bulletin 1087 describes portable oil burners for heating and drying ladles.

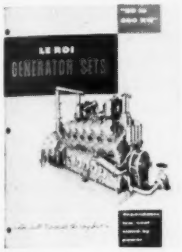
For More Details Circle No. 155—Page 199

PROPELLER FANS: ILG Electric Ventilating Co., 2850 North Pulaski Road, Chicago 41, Ill.—Guide to the selection of propeller

fan ventilating equipment is offered in catalog 151. Construction features are illustrated. Specifications and installation data on portable, tubeaxial, centrifugal and roof ventilator fans are included.
For More Details Circle No. 156—Page 199

ALUMINUM ALLOYS: Kaiser Aluminum & Chemical Sales Inc., Industrial Service Division, 1924 Broadway, Oakland 12, Calif.—Booklet on product design and manufacture includes section on casting alloys. A selection guide and tables giving mechanical, casting and service properties are included.
For More Details Circle No. 157—Page 199

ENGINE-GENERATOR SETS: Le Roi Division, Westinghouse Air Brake Co., 1706 South 68th St., Milwaukee 14, Wis. — Seven engine models from 60 to 675 hp with generators capable of producing from 50 to 350 KW are described in bulletin G-6. Combined horsepower and kilowatt charts give an accurate picture of maximum, intermittent and continuous horsepower in kilowatt ratings at varying rpm. Installation drawings show basic dimensions for all models.



For More Details Circle No. 158—Page 199

EMBEZZLEMENT CONTROL: Public Service Division, Fidelity and Deposit Co., Baltimore 3, Md.—Practical methods of combatting embezzlement are described in "Embezzlement Controls for Business Enterprises" written by Lester A. Pratt, C. P. A.
For More Details Circle No. 159—Page 199

PRECISION INSTRUMENTS: W. C. Dillon & Co., P.O. Box 3008, 14620 Keswick St., Van Nuys, Calif.—Precision instruments for materials testing, weight indication, mechanical pressures, heat measurement, overload warning and static load testing are covered in bulletin 19-F.
For More Details Circle No. 160—Page 199

AIR CONDITIONING: Surface Combustion Corp., Toledo 1, O.—Benefits of cupola dry blast are mentioned in the new issue of the "Humidity Engineer," a publication devoted to industrial process and comfort air conditioning problems.
For More Details Circle No. 161—Page 199

INDUSTRIAL SERVICES: Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 30, Pa.—Copies of "This is Blaw-Knox" contain information on all manufacturing divisions of the company.
For More Details Circle No. 162—Page 199

TEMPERATURE CONTROL: Minneapolis-Honeywell Regulator Co., Industrial Division, Wayne & Windrim Aves., Philadelphia 44, Pa.—An automatic system for time-temperature control of recirculating stress-relievers

Shell Molding

SAVES 6 MONTHS

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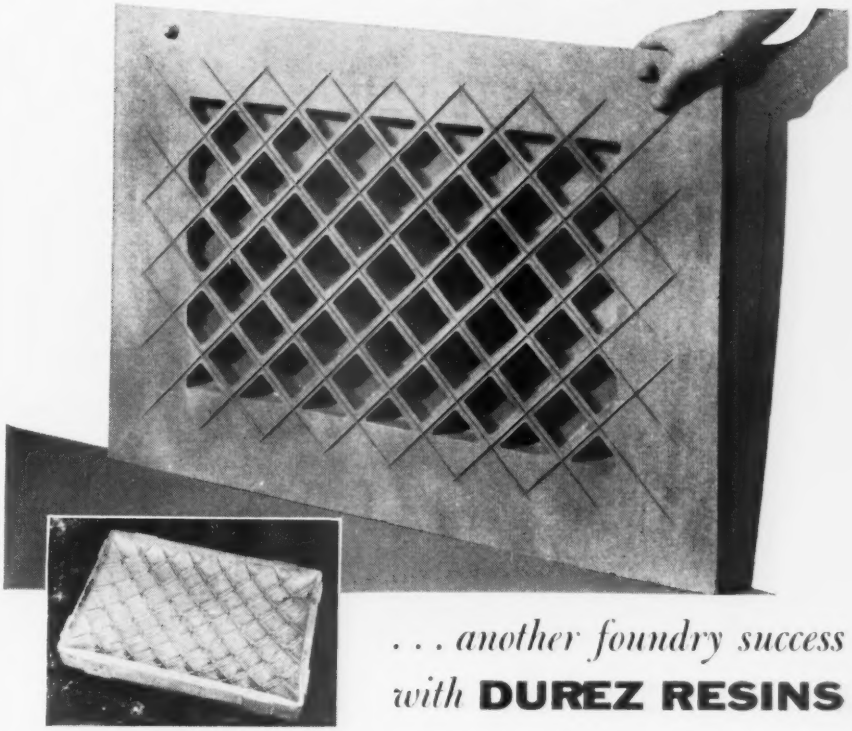

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ing furnaces is discussed in instrumentation data sheet 5.2—4a. While fully automatic in operation, the system can be altered to meet changing conditions.
For More Details Circle No. 163—Page 199

HYDRAULIC CRANE: Austin Western Co., 601 Farnsworth Ave., Aurora, Ill.—Indoor-outdoor hydraulic crane is described in bulletin AD-2253. Included are specifications, performance data, diagrams on working ranges, manual boom extensions, minimum aisle widths for turns and descriptions of attachments and special equipment.
For More Details Circle No. 164—Page 199

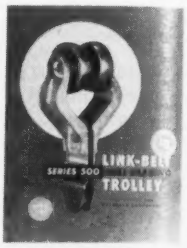
ALLOYS AND INGOTS: Niagara Falls Smelting & Refining Division, Continental Copper & Steel Industries Inc., 2204-2214 Elmwood Ave., Buffalo 23, N. Y.—Monthly publication, "Better Castings," gives information on ingots and alloys.
For More Details Circle No. 165—Page 199

BELT CONVEYOR IDLER: Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.—Details of a cable-suspension idler for belt conveyors are offered in bulletin LD-103.
For More Details Circle No. 166—Page 199

I-BEAM TRACK: Jervis B. Webb Co., Detroit, Mich.—Brochure tells how lightweight trolley conveyor cuts production costs using a new 2⅝-in. I-beam track.
For More Details Circle No. 167—Page 199

CUT-OFF MACHINE: Fox Grinders Inc., Oliver Bldg., Pittsburgh 22, Pa.—Three pictures illustrate a swing-frame cut-off machine which can be used in four different applications.
For More Details Circle No. 168—Page 199

BALL BEARING TROLLEY: Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.—New line of ball bearing trolleys for overhead conveyors is covered in book 2536. The 20-page publication contains specification data for the selection of new trolleys, or of replacement trolleys for existing installations. Trolleys are for use on 3, 4 or 6-in. I-beams. Engineering pictures, application and maintenance information and a description of commonly used attachments are included.



For More Details Circle No. 169—Page 199

GAS ANALYZERS: Mine Safety Appliances Co., 201 North Braddock Ave., Pittsburgh 8, Pa.—Complete line of combustible gas analyzers and alarms is described in brochure 0703-3.
For More Details Circle No. 170—Page 199

BATTERY MAINTENANCE: Gould-National Batteries Inc., Trenton, N. J.—Technical training man-

3

MAJOR GRINDLE INSTALLATIONS NOW OPERATING IN LEADING FOUNDRIES

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Each installation involved a solution to a distinct engineering problem . . . and Grindle "know how" and background of experience produced the answers that led to efficient, economical operation.

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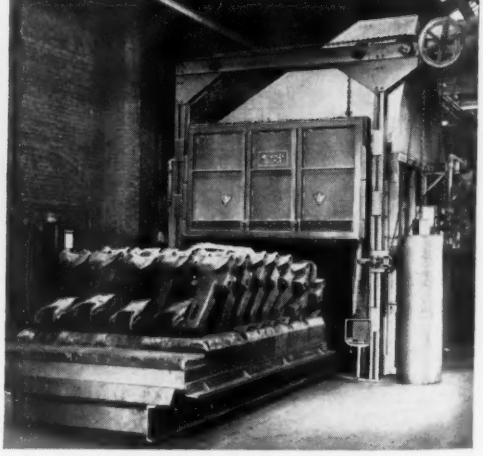

Engineering experience is apparent in the smooth operation of the Johnston Car Bottom Furnace. Roller bearings in car and door hoist shafts, mechanical car seals, and power operated car pullers are just a few of many practical features. Johnston "Reverse Blast" low pressure burners for oil or gas assure clean, economical, efficient heat for annealing, normalizing, and stress relieving.

Write for Bulletin F-240

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ual on lead-acid storage batteries for electric industrial truck use has been designed to enable users of battery-powered industrial trucks to organize battery maintenance training programs in their own plants. Ten sections are included in the 44-page book.

For More Details Circle No. 171—Page 199

INVESTMENT CASTINGS: Haynes Stellite Co., General Publicity Department, Distribution Section, 30-20 Thomson Ave., Long Island City 1, N. Y.—November 1954 issue of *Haynes Alloys Digest* contains directions for obtaining sample investment castings and description of immersion basket for corrosion applications.

For More Details Circle No. 172—Page 199

WATERLESS SKIN CLEANER: Hammond Products Inc., 1143 Wildwood, Ft. Wayne, Ind.—Literature describes a waterless skin cleaner containing lanolin and similar emollients and hexachlorophene and its advanages of reduced cleaning time.

For More Details Circle No. 173—Page 199

ALLOY PRODUCTS: Specialloy Inc., 4025 South Keeler Ave., Chicago 32, Ill.—Electric furnace alloys for iron, steel and brass foundries are tabulated in a bulletin. Composition, use and properties developed are given for each alloy.

For More Details Circle No. 174—Page 199

WELDING ELECTRODES: Metal & Thermit Corp., 100 East 42nd St., New York 17, N. Y.—Application and procedure data on mild steel and low alloy arc welding electrodes are given in a 30-page catalog designed to aid in electrode selection.

For More Details Circle No. 175—Page 199

THERMOCOUPLE WIRE: Claud S. Gordon Co., 3000 South Wallace St., Chicago 16, Ill.—Thermocouple wire, thermocouple assemblies, furnaces and sand testing equipment are described in service bulletin Vol. II, No. 1.

For More Details Circle No. 176—Page 199

NEW BELT POWER: Manhattan Rubber Division, Raybestos-Manhattan Inc., Passaic, N. J.—Design characteristics of a single, endless power transmission belt with molded lengthwise ribs are explained in brochure 6638.

For More Details Circle No. 177—Page 199

pH SYSTEMS: Bristol Co., Waterbury 20, Conn.—Complete systems for pH recording and control are announced in bulletin Q1304. Full engineering specifications and installation methods are given.

For More Details Circle No. 178—Page 199

SPRAY BOOTHS: Despatch Oven Co., 619 Eighth St. Southeast, Minneapolis, Minn.—Construction features, drawings and tables describe advantages of engineered water wash spray booths in bulletin 66.

For More Details Circle No. 179—Page 199

VARIABLE SPEED DRIVES: Cleveland Worm & Gear Co., 3249 East 80th St., Cleveland 4, O.—Variable speed reducer in which power

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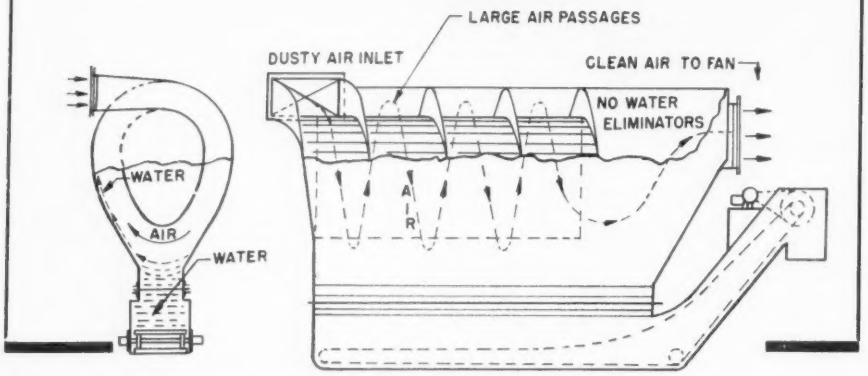

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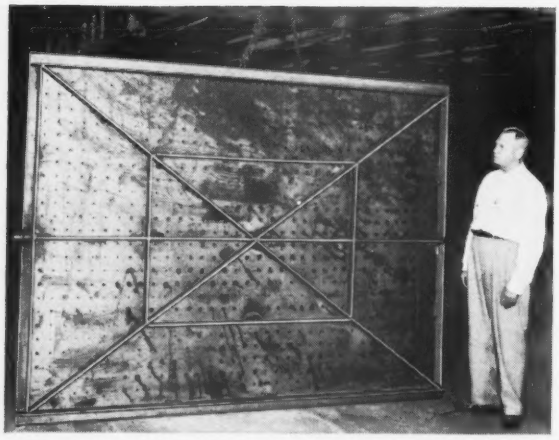

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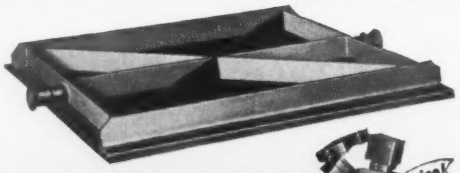

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is transmitted from the input shaft to the output shaft through alloy steel driving balls in pressure contact with disks attached to the two shafts is described in bulletin K-10[illegible].

For More Details Circle No. 180—Page 199

WIRE ROPE ASSEMBLIES: Macwhyte Co., Advertising Dept., Kenosha, Wis.—Catalog 5201 illustrates wire rope assemblies consisting of a length of wire rope with a terminal attached to one or both ends. Pin eye, oval eye and ring eye sizes are described in tables.

For More Details Circle No. 181—Page 199

INSTRUMENTS: Illinois Testing Laboratories Inc., Room 541, 420 North La Salle St., Chicago 10, Ill.—Bulletin 2982 gives brief descriptions of pyrometers, thermocouples, dew point indicators, temperature controllers and direct reading air velocity meters.

For More Details Circle No. 182—Page 199

FLUID POWER EQUIPMENT: Oilgear Co., 1580B West Pierce St., Milwaukee 4, Wis.—Pumps, motors, transmissions, cylinders and valves and accessories are described in bulletin 10051-D. Tables of specifications are included.

For More Details Circle No. 183—Page 199

DUST CONTROL: Pangborn Corp., Hagerstown, Md.—Information on dust control and blasting equipment plus selection of humorous and unusual news items makes up monthly news publication.

For More Details Circle No. 184—Page 199

HANDLING EQUIPMENT: Brummeler Steel Products Corp., Grand Rapids 2, Mich.—Several types of steel boxes, skids, self-dumping end hoppers and pallets are pictured in bulletin 550.

For More Details Circle No. 185—Page 199

INVESTMENT ALLOYS: Cannon Muskegon, Muskegon, Mich.—Analyses of stainless and tool steels including nickel and cobalt-base alloys for the investment casting industry are given in a booklet.

For More Details Circle No. 186—Page 199

TRUCK SHOVELS: Buda Co., Division of Allis-Chalmers Mfg. Co., Harvey, Ill.—Specifications and illustrations of mechanical and hydraulic scoop type shovels make up a product release.

For More Details Circle No. 187—Page 199

Molding Sand Symposium

Reprints of the 38-page "Molding Sand Symposium" published in the November issue are available. It consists of nine articles discussing molding sand practice in ferrous and nonferrous foundries. Reprints are 50 cents each; quantity prices may be obtained upon request. Address inquiries to FOUNDRY, Book Department, Penton Building, Cleveland 13, O.

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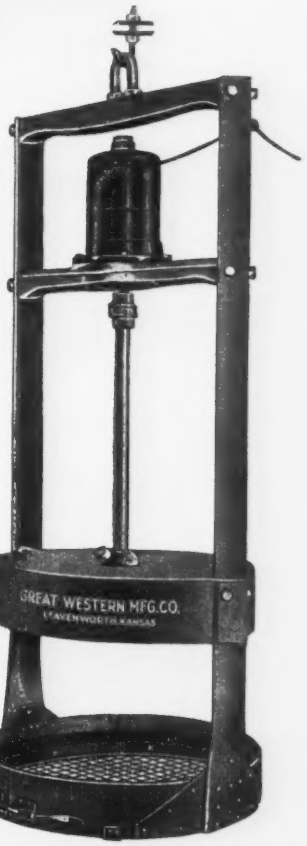

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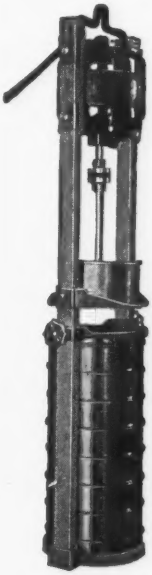

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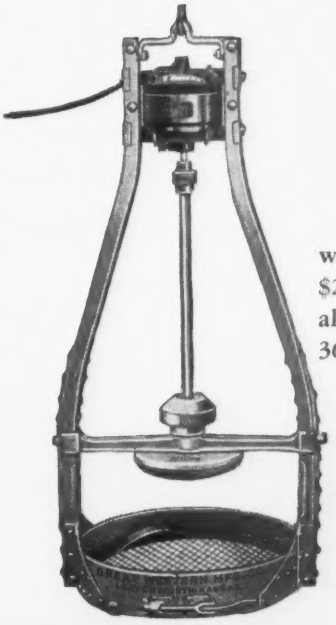

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THE SHAKEOUT

Electric Cable Keeps Sand from Freezing

FREEZING and caking of molding sand during the winter is an old foundry problem. Lackawanna Foundry Co., Lackawanna, N. Y., used to heat the sand with salamander stoves, a method which lost time and labor and produced noxious fumes which made working conditions unpleasant. Now the company uses Thermwire

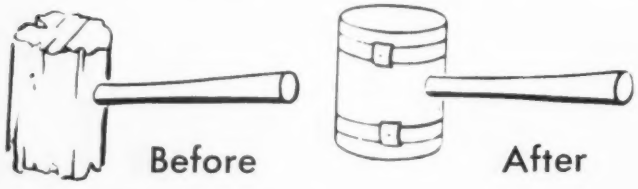
electric heating cable, produced by Edwin L. Wiegand Co., Pittsburgh, to do the job.

Each bench molder has one set of heating cable, 80 ft long, rated at 400 watts, with which he covers the sand at the end of the day. When work resumes, he removes the cable, and the sand is ready for immediate use.

For More Details Circle No. 188—Page 199

Hose Clamps Add to Life of Mallets

AN UNUSUAL application for hose clamps is said to save more than $2200 per year for a water pipe foundry. The foundry uses hickory mallets made in its pattern shop to knock sand cores out of bell and spigot hub castings. Mallets cost 82 cents each and were being



used at the rate of 12 per day.

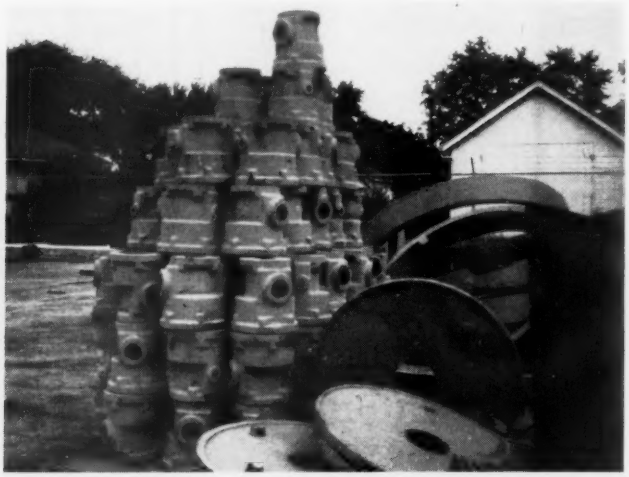
A member of the organization suggested that hose clamps made by Punch-Lok Co., Chicago, and used in the foundry for general shop maintenance could be employed to reinforce the mallet heads. Although the cost of each mallet was raised from 82 cents to $1.20, only one mallet now is used per day, for a daily saving of $8.64.

For More Details Circle No. 189—Page 199

Coating Protects Castings in Storage

CASTING STORAGE frequently poses a problem, particularly when castings must be stored outdoors, as they are at Shartle Bros. Machine Co. Division, Black-Clawson Co., Middletown, O. The company uses many large castings and usually keeps a sizable supply on hand. They are produced at the parent company plant in Hamilton, O.

At one time, stored castings were protected by a lac-



quer-type coating. Although it was economical, the coating was not permanent. It had to be renewed, and castings frequently rusted where the coating had cracked or chipped. In the long run, costs piled up.

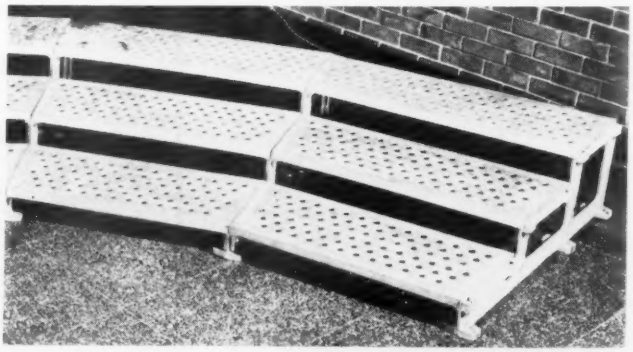
A solution to the problem was found in Zincilate 600, one of 14 anticorrosion coatings produced by Industrial Metal Protectives Inc., Dayton, O. Applied with ordinary paint spray equipment, it air dries to a gray matte finish and provides protection against corrosion even when castings are subjected to bad weather for long periods. It eliminates scraping and cleaning and serves as an excellent primer. Shartle Bros. estimates savings of 30 per cent in labor costs plus savings in material costs.

For More Details Circle No. 190—Page 199

Portable Stage Is Light but Strong

THE THREE-LEVEL portable stage shown here weighs only 350 lb, but can accommodate a 20,000-lb load or as many as 50 people. Used on tours by Normennenes Sangforening, a Norwegian singing society from Chicago, it was cast at Berntsen Brass & Aluminum Co., Madison, Wis., owned by Osvald Berntsen, who is a member of the singing group.

Constructed of Federated Tenzaloy, an aluminum alloy



produced by Federated Metals Division, American Smelting & Refining Co., New York, it consists of 30 14 x 48-in. sections held together by a lock-pin arrangement and occupies only 10 x 36 ft when set up. When cast in

(*Concluded on page* 244)

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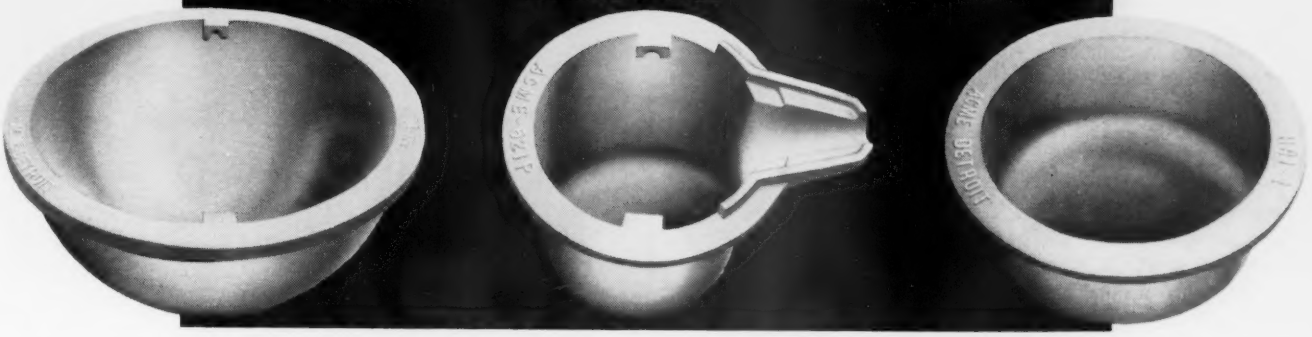

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Don't let size and variety of band saw work slow up your pattern makers. This "Oliver" handles the widest range of scroll work smoothly and rapidly. Takes 21" under guide, 38" between saw and column. Table tilts 45° to right, 5° to left. Demountable ring-disk wheels—lightest, strongest, most rigid made. Lower wheel mounted on motor shaft in permanent alignment with base. Any type motor drive can be furnished. Has efficient braking system. Write for Bulletin No. 115-D.

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"Oliver" Band Saws also made with 18", 30" and 36" wheels

OLIVER MACHINERY COMPANY

Established 1890 GRAND RAPIDS 2, MICHIGAN

THE SHAKEOUT

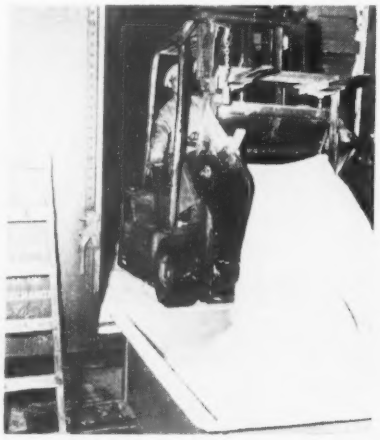
(*Concluded from page* 242)

sand molds and aged at room temperature for 10-14 days, the alloy has tensile strength of 35,000 psi, yield strength of 25,000 psi and a brinell hardness of 74. It requires no special foundry technique.

For More Details Circle No. 191—Page 199

Special Hoppers Speed Sand Unloading

THE TASK of unloading sand from rail cars now is accomplished much faster and more safely than before at Electric Steel Foundry Co., Portland, Oreg. The company has fabricated two special hoppers which are loaded by a maneuverable Hyster lift truck with scoop attachment which works in the car. The 4-ton hoppers are self-dumping and portable and replace 1-ton buckets which had to be hand-dumped. Unloading time is cut from 12 man-hours to 4.



Since the new hoppers hold four times as much sand as those used previously, the crane which transports it makes only one-fourth as many trips, releasing it for other work in the scrap yard. The self-dumping feature of the boxes is an aid to safety because the old buckets were unloaded by a man who remained on top of the sand bins and hand-dumped the buckets, always in danger of injury.

For More Details Circle No. 192—Page 199

Weight Held Down by Aluminum Alloy

USE OF aluminum alloy castings has enabled Lewis-Shepard Products Inc., Watertown, Mass., to build a 2000-lb hand pallet truck that weighs only 250 lb. Forks measure 48 in. long by 27 in. wide.

The design problem that confronted Lewis-Shepard engineers was to find a lightweight alloy with high yield strength, great shock resistance and easy machinability. Frontier 40-E aluminum alloy met all these requirements without heat treatment and also offered corrosion resistance. The resulting design is shown here, in the form of one of the trucks in operation.

Light weight and ball-bearing wheels make pulling easy even when the truck is loaded. The load is lifted hydraulically when the operator pumps a foot pedal with his right foot. Lowering is accomplished by a release valve on the lifting head enclosure.

For More Details Circle No. 193—Page 199

Battery Servicing a One-Man Job

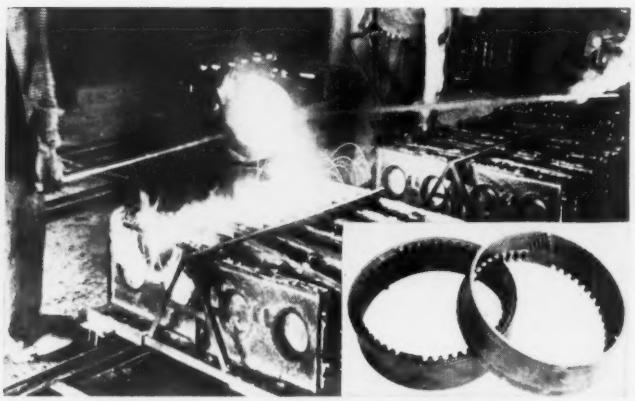
ONE MAN now can service the batteries of all 19 electric industrial trucks used by a large automotive plant whereas the job used to require two men per truck. Key to the operation is what the manufacturer, who developed it, calls a multiple overhead lead battery charging system. The trucks, all products of Automatic Transportation Co., Chicago, are lined up as shown here, and short cables leading from an overhead power duct connect easily with the batteries. The system is reported to extend battery life, save time of personnel and cut maintenance. Under the new system, the 1638-lb batteries, which cost about $1500 each, are washed as often as necessary adding three or four years to the life of each battery.

For More Details Circle No. 194—Page 199

Shell Molded Parts Need No Machining

CLOSE TOLERANCES eliminate all machining operations on shell-molded stainless steel shredder rings for garbage disposal units manufactured by Westinghouse Electric Corp. Produced at Cooper Alloy Corp., Hillside, N. J., the rings are cast in shell molds bonded by Bakelite phenolic resins.

Gases from the molten stainless steel escape through the thin, porous shell, eliminating surface imperfections and resulting in a high percentage of sound castings. The shell molds require little storage and production floor space and lend themselves to flexible, mechanized foundry operations.



For More Details Circle No. 195—Page 199

No. 4 DAYTON RING VALVE BENCH RAMMER

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The Valve Units will last for years. The Cylinder Bores and Piston Rods are HARD CHROME PLATED which doubles the life of the Rammer. Many of the largest foundries in the country have already adopted them as standard. Made in six sizes to meet every requirement.

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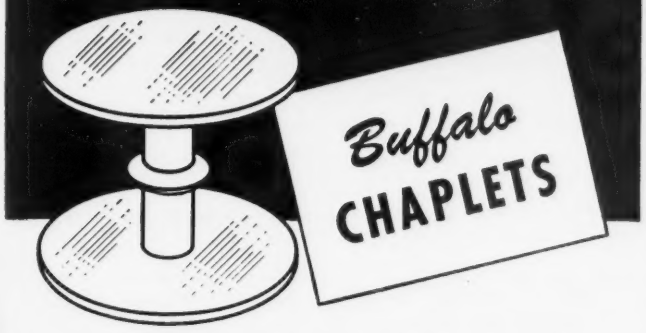

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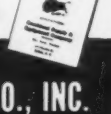

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These Four BLAW-KNOX *Buckets* Help Solve Your Rehandling Problems for Average or Unusual Conditions

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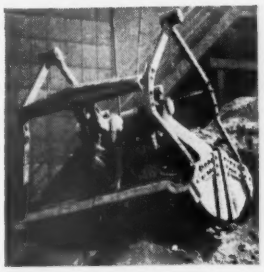
FOR EXTREMELY LOW HEADROOM



THIS Single-Line Hook-On Bucket solves rehandling problems when headroom is extremely limited. The ¾ yd. capacity bucket requires only 6'7" operating headroom. Also available in larger sizes.

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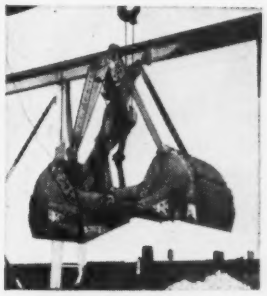
Blaw-Knox Shark Tooth Buckets are available in a wide range of sizes and for different headroom conditions.



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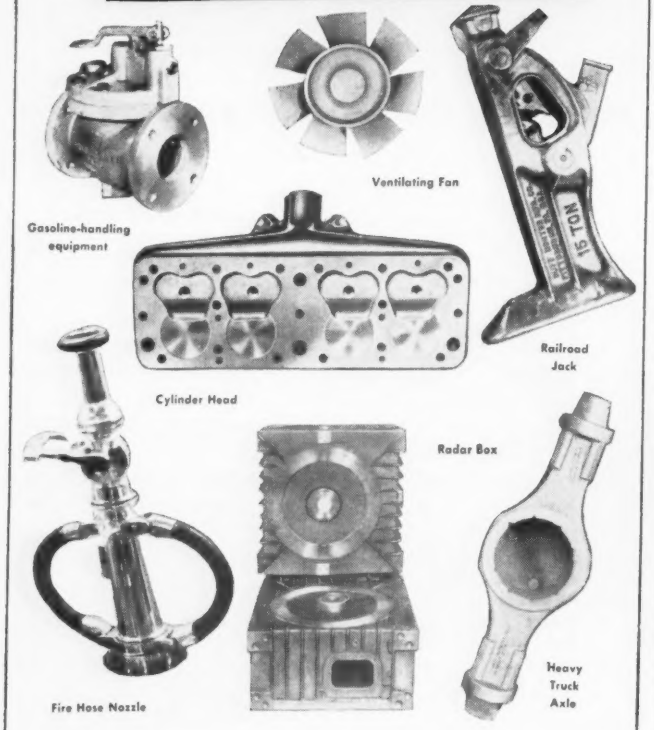

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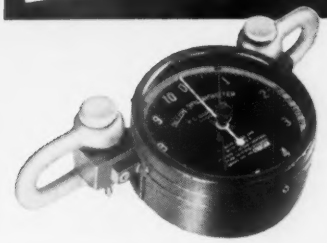

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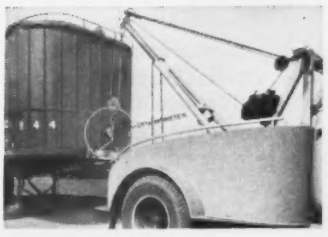
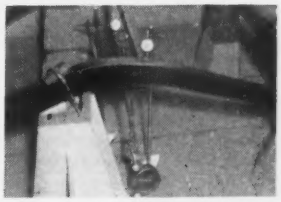


√ Testing Wrecking Truck Winch and Boom. Modern automobile wrecking trucks are often called upon to lift and pull exceedingly heavy loads. Above, the DILLON DYNAMOMETER is checking these factors in a new model wrecking truck manufactured by the Ashton Power Wrecker Equip. Co., Inc. Pull is against a heavy semi-trailer. Tests like these on heavy equipment are very easy with a DILLON DYNAMOMETER.



√ Here is a DILLON DYNAMOMETER at the Ford Motor Co. in Dearborn, Mich. employed to "buckle" a car frame through ordinary turnbuckle. In this way, the Body and Frame Section laboratory was able to determine the load necessary to take full shock absorber punishment.

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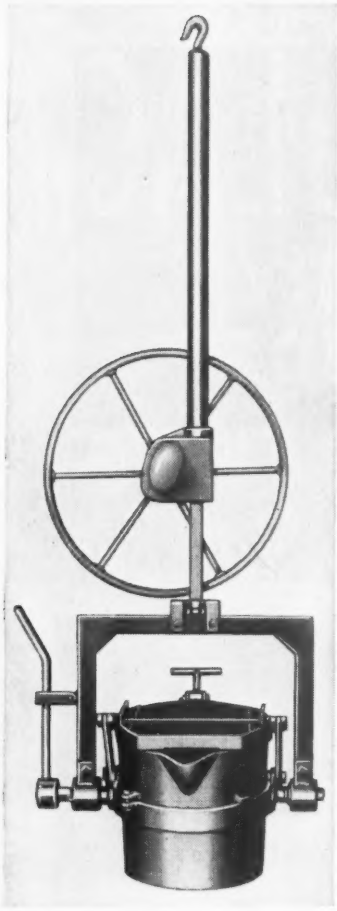

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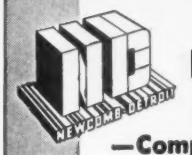

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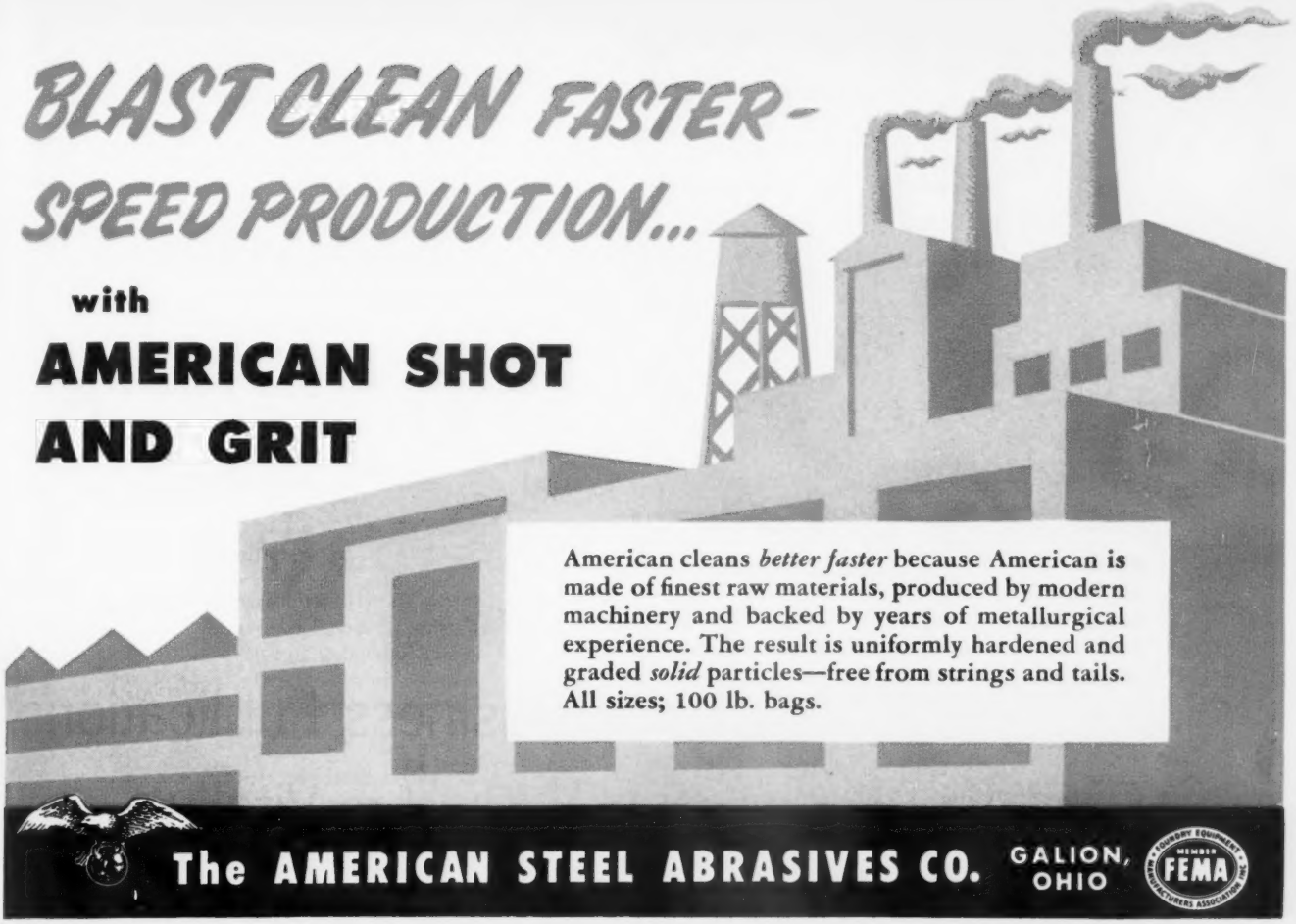

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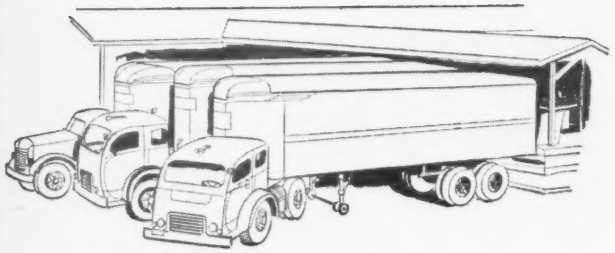

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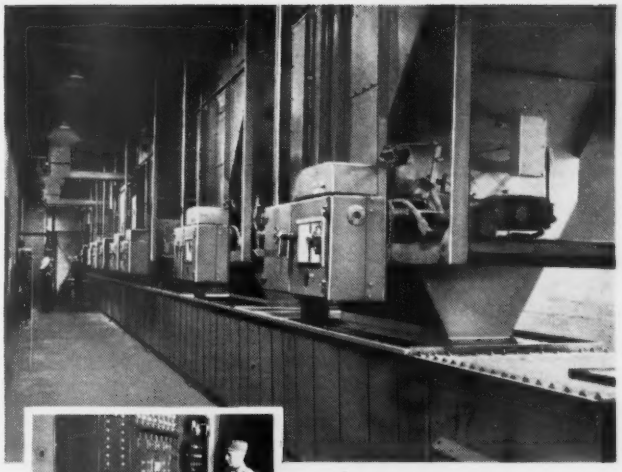

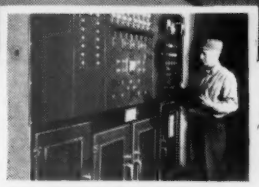

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EX 1-8930

MACHINERY FOR SALE

One Simplicity Gyrating Screen Shakeout Machine, Model D, size 5 feet by 8 feet, floor area 15 feet by 20 feet—with 3 phase, 25 cycle, 440 volt operating motors. Reason for selling—too small for our use. In use now and available after January 1, 1955.

GARDNER-DENVER COMPANY
QUINCY, ILLINOIS

FOR SALE

One International Rollover Draw Molding Machine—27 x 12 draw. Long model Type F. Table size 24" x 72". Serial No. 32139. Turn over capacity 2500 lbs. Good condition. Price $1200.00 F.O.B. Palmyra, New Jersey. Address: **PALMYRA FOUNDRY CO., ARCH STREET STATION, PALMYRA, NEW JERSEY.**

For Sale

FOR SALE

MOLDING MACHINES
1—Herman, Jolt, Rollover Draw, 6000#, 40" x 60" table.
1—Herman, Jolt Stripper, 48" x 54" table.
2—International, Jolt, Rollover Draw, 24" x 10G, Stationary.
2—International, Jolt, Rollover Draw, 20" x 8-G, Portable.
1—SPO #305 Jolt Stripper.
2—No. 275 Osborn jolt squeezers.
1—#610 Johnston & Jennings Air Jolt Rollover Draw Portable 24 x 30 table.
1—Tabor 36 x 50 table Air Jolt Rollover Draw, 3000# capacity.

CORE OVENS
1—Coleman Recirculating 3 section with 5 drawers per section.
1—Cole Recirculating 4 section with 5 drawers per section.

BLOWERS FOR CUPOLAS AND FURNACES
1—Connersville Rotary Blower, 3500 CFM.
2—15 HP Spencer-Turbine 2250 CFM at 16 oz.
2—#7½ Roots rotary blowers—27 x 81—14000 CFM.
1—Connersville rotary blower 22 x 66 45 cu. ft. per revolution 9000 CFM.
Maxon-Premix Blowers for Gas ¼ to 1 HP.
2—5 HP 20-oz. Spencer Turbine Blowers.
2—2 HP 20-oz. Spencer Turbine Blowers.

METAL MELTING EQUIPMENT
1—1000# open flame brass melting furnace, gas fired.
1—550# Reda Furnace, nonferrous or iron—oil or gas.
1—Hausfeld Stationary Brass, oil or gas burner, 200# cap.
1—Hausfeld Tilting crucible, gas, 250# Al. Cap.
1—Hausfeld 2000# aluminum capacity furnace, barrel type, open flame, oil fired.
Never used 32" to 41" dia. shell cupolas made to order.
Never used 1000 lb. aluminum cap. tilting crucible furnaces to specifications.

MISCELLANEOUS
1—Pangborn Rotoblast, 14' dia. table with five 5' tables complete.
1—Pangborn 1 to 4 nozzle air blast generator, complete.
1—American Dust Tube Collector, 30 HP blower, 12000 CFM.
1—Sullivan, 2 stage compressor, 14-8¾ x 10, 75 HP.
1—20 HP U. S. Four Speed Snagging Grinder, 24" x 3" wheels.
1—15 HP Gardner Denver air cooled compressor unit.
1—Stoney crane type shakeout.
1—NC-4 Royer sand separator.
1—#1 Demmler core blower.
1—#16 Roto-clone unit complete.
1—36 x 48 tumbling mill.
1—30 x 48 tumbling mill.
Complete stock of rebuilt mill and dust exhaust blowers.

CLIFTON MACHINERY COMPANY
1023 W. SIXTH ST. CINCINNATI 3, OHIO

FOR SALE

American Wheelabrator Tablast #3 with 4-48" tables complete with dust collector, blower, motors, controls $4250.00
#30 Tabor Hydraulic Jolt Rollover pattern draw molding machine, 30" x 41" table, 12" draw $1100.00
25—Osborn Molding Machines #2047-4 Jolt Rollover, table 18" x 24", 8½" draw..... $350.00
20—SPO 110J Jolt Squeeze $225.00
24—Tabor Molding Machines, 10" squeeze. $115.00
Beardsley & Piper Speed Muller #40.... $1000.00
Adams Hand Squeeze Molding Machine, 34" $75.00
Royer Portable Sanditioner, large size.... $150.00
200 Flasks, 16" x 12", 6" draw, never used. $7.00
Core Oven, Gehnrich, 5' x 4' x 7'..... $300.00
Gehnrich Oven, 10' x 9' x 10', with motor and controls, 550° F. $800.00
8—Pangborn 224CD3, 1695 CFM, complete $550.00
American Dustube #65, complete with motors and blower $850.00
Rotoclone, sludge type, 2500 CFM..... $650.00
Pangborn EN2 cabinet, with dust collector $500.00
Riddles, gyro $85.00
Whiting Gear Ladles, 1000-2000 lbs..... $50.00
3—Wheelabrator Skip Hoist Loaders..... $300.00
American Dustube A35 complete $450.00
Spencer 5 HP, 16 oz. CFM rotary pressure blower $200.00
Hardness Testers, Magnaflux Inspection Machines, Air Compressors.

M. ELSTEIN
422-6 GRAND STREET
JERSEY CITY 2, NEW JERSEY

BUY—SELL—TRADE

48 x 42 Wheelabrator Tumblast $2,500.00
36 x 42 Wheelabrator Iron Belt $2,950.00
#2 Wheelabrator Table 8' Diameter.. $3,500.00
#1A 4' Wheelabrator Table (Like New) $3,000.00
Pangborn 6' Multi Table Good Condition $3,000.00
Pangborn ES-421 Shell Machine (Like New) .....30% actual cost
Pangborn EN-2 Hand Cabinet ..... $ 300.00

ALSO

American Dust Collectors, Pressure Tanks various sizes, Hand cabinets, Blower Motors all types and sizes.

If you are interested in trading the above for your present equipment—Please call or write:

DIAMOND SAND BLAST, INC.
5654 W. JEFFERSON AVENUE
DETROIT 9, MICHIGAN
PHONE: VINEWOOD 3-6750

FOR SALE

1—American Slag Conveyor System ½ H.P.—220/440-60-3 Like New.
1—Simplicity "KA"—18" x 78" Shaker feeder, 1 H.P.—220/440-60-3, Vari Speed drive—Like New.
1—Penn Bucket 20 cu. ft.—Like New.
1—Blystone 2A (3 cu. ft.) mixer 1 H.P. 220-60-3.
1—American Continuous Wheelabrator—15" with spare parts 220-60-3—Exc. Cond.
1—12" x 132" Flat apron conveyor 220/60/3.
1—Whiting 2500# Mixing ladle—geared—28" x 60".
1—Modern 2500# Mixing ladle—geared—29" x 54".
1—Nichols #11-32 Jolt-squeeze-strip Molding Machine.
1—Nichols #12 Heavy duty Jolt-squeeze-strip Molding Machine.
1—Osborn Plain Jolt #100.
1—Conveyor—2 sections Flat apron, 24" x 204" (both sections) with vari-drive 220-60-3.

WRITE OR CONTACT:
J. T. MOORE
WELLS MFG. CO.
7800 N. AUSTIN AVENUE
SKOKIE, ILLINOIS

FOR SALE

1—Tinius Olsen 100,000# Universal Compression Testing Machine
1—Magnaflux Demagnetizing Unit
Simpson Sand Mixers 18" dia. Laboratory #0, #1, #1½, #2, #3
Miscellaneous: Screens, Pulverizers, Grinders, Conveyors—all types, Tyler Rotap Screens, etc.
OUR 37TH YEAR

CONSOLIDATED PRODUCTS CO., INC.
66 BLOOMFIELD STREET
HOBOKEN, NEW JERSEY
HO 3-4425 N.Y. TEL. BA 7-0600

FOR SALE

Surplus Pangborn Sandblast Parts, as listed below; in exceellent condition. Will sell at ½ price. Only a few additional parts would have to be purchased to make complete unit:
1—Serial IC3-51145 Elevator
1—Serial IC3-51150 Elevator
1—Serial BVR7-51287 Abrasive Separator
1—Serial BVR7-5128S Abrasive Separator
1—Serial 1AU11-5211 Abrasive Tank
1—Serial 1AU11-523 Abrasive Tank
1—Type CH2 Dust Collector
1—Sturtevant Silentvane Fan Blower; Size 70; Design 10; Style W-55570; Pangborn Serial 14K02-515.

THUNDER BAY MANUFACTURING CORP.
ALPENA, MICHIGAN

FOR SALE
SHOT BLAST EQUIPMENT

American Wheelabrator Tumblast, 48" x 42", serial number A-13853. Motors 440-60-3.

CLARK EQUIPMENT CO.
BUCHANAN, MICHIGAN

FOR SALE

1—4' x 8' Sand Blast Cabinet, Dust Arrestor; 2 B & P Mulbaros; 1 Model S Screenarator; Stock Core Machine, motor, 2 double end Grinders, 12" and 24" wheels; Electric Hoists; many other items.

SOMIL EQUIPMENT & SUPPLY CO.
620½ MARQUETTE AVE.
SO. MILWAUKEE, WIS.
PHONE BR 1-7060

FOR SALE

TURBO BLOWERS WITH MOTORS

CFM	PRESS.	MAKE	CFM	PRESS.	MAKE
6000	32 oz.	Ing.-Rand	660	20 oz.	A-B
4700	32 oz.	Ing.-Rand	500	10 oz.	No.Am
4050	16 oz.	No. Am.	400	4.3 oz.	Spence
3500	40 oz.	Spencer	340	20 oz.	A-B
2800	1 oz.	Spencer	320	12 oz.	Spence
2700	16 oz.	Spencer	180	15 oz.	Spence
2500	7 oz.	Sturt.	9000	6" SP	Northern
2000	2½ oz.	Spencer	2500	½" SP	American
2000	1 oz.	Spencer	2344	2" SP	Clarage
1150	20 oz.	No.Am.	1100	4½" SP	Bayley
675	16 oz.	No.Am.			

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVE.
CLEVELAND 14, OHIO

FOR SALE

1—B & P Swingslinger with 2 ton B & P Plate feeder. Large supply of tips and liners
1—Skip Hoist for #2 Simpson Muller
2—Bristol Recording Thermometers for core ovens, 40°-700° range; 24 hour dials; 20' thermocouple bulbs. 1—never used. 1—used 2 months
1—Jaeger Mobile Crane, solid rubber tires, 5 ton capacity, 18' telescopic boom.

MEECH FOUNDRY, INC.
9906 MEECH AVENUE
CLEVELAND 5, OHIO
MICHIGAN 1-5550

FOR SALE
OSBORN MOLDING MACHINES

4—275J jolt squeezers ..... $225.00 ea.
2—559 jolt strippers ..... $750.00 ea.
1—561 jolt stripper $3250.00
1—714PJ jolt squeeze stripper $1500.00
2—814P jolt squeeze strippers ..... $1250.00 ea.
4—601 jolt rollover and draw ..... $450.00 ea.
6—2047-4 jolt rollover and draw .... $650.00 ea.
2—405-95 jolt rollover and draw ..... $450.00 ea.

MASTER FOUNDRY CO., INC.
15019 SARANAC ROAD
CLEVELAND 10, OHIO

FOR SALE

1—Model M 99/80 Sand Cutter
3—NC242 Royers—12"
1—Simpson Model 2 Muller, Style B, complete with speed reducer. skip loader, dusthood, motors, and starters.

RECONDITIONED

MID-CITY FOUNDRY COMPANY
1521 WEST BRUCE STREET
MILWAUKEE 4, WISCONSIN

FOR SALE

2—North American Blowers, 1300 CFM-Vol. 16 Press. Oz. 7" sq. discharge opening, 10 HP AC Motors, 220-440 volts, 3480 RPM, 1950 Models.
Price f.o.b. Chicago.....$450.00 ea.

JOCELYN IRON & STEEL CORP.
2847 S. KEDZIE AVENUE
CHICAGO 23, ILLINOIS
LAFAYETTE 3-7343

FOR SALE

OSBORN, size 563-9, Jolt Stripper Molding Machine, table 55 x 63, 7000# capacity.

THE NATIONAL RADIATOR COMPANY
ELLWOOD CITY RD.
NEW CASTLE, PA.

FOR SALE
DETROIT ELECTRIC FURNACE

Type AA of 1,200 lb cold metal or 2,600 lb hot metal capacity, complete with mechanical and electrical equipment for melting and rocking, including oil filled transformer of 11,000 v. primary and 125 v. secondary. Presently crated but available for inspection on 48 hours notice. Ideal for high test cast irons, brasses or bronzes. Price: $9,500.00. Address: HOPE ELECTRICAL PRODUCTS CO., 338 WILSON AVENUE, NEWARK 5, N. J.

FURNACES FOR SALE

Ten used heat treating furnaces and two 7-ton gantry cranes. Good condition, priced to sell. Address: BAER STEEL PRODUCTS, INC., BOX 1428, BOISE, IDAHO.

We have a very large stock of good used foundry equipment. Your inquiry is appreciated.

FOUNDRY EQUIPMENT

SPECIAL BARGAINS

1—Beardsley-Piper Motive Sandslinger Junior Type, 19″ head, 4″ tip, motors 220/3/60.

6—Simpson Sand Mullers No. 1, 2 & 3 complete with loading device 220/440/3/60.

3—Rotoblast Tables 6′, 8″ & 9′ Pangborn, Mott, complete 220/440/3/60.

2—405-95 Osborn Jolt Roller & Pattern Draw Molding Machines 26″ draw.

1—Never used. 22″ x 42″ Tabor Portable Jolt Rollover & Pattern Draw Molding Machine, 10″ draw.

1—Pigmold Conveyor 64 ft. sprocket centers, Link-Belt complete with drive.

1—Link-Belt Roller-type car Power mold conveyor, 27′ x 70′6″ centers, 35 cars 38″ x 72″, complete with drive, speed reducer, motor and controls, 220/440/3/60.

1—3-ton Bedford Bridge Crane 49′ span 30 H.P. Hoist motor, 10 H.P. travel motor, 3 H.P. trolley motor 220/440/3/60.

1—150 H. P. 800 CFM Ingersoll-Rand two stage air compressor 220/3/60, with air receiving tank.

WE BUY AND SELL ONE PIECE OF EQUIPMENT OR COMPLETE FOUNDRIES

OUR GUARANTEE:

IF YOU ARE NOT SATISFIED WITH OUR EQUIPMENT, YOU MAY RETURN IT FOR A FULL REFUND.

EUCLID FOUNDRY & MACHINE EQUIPMENT COMPANY

14919 SARANAC ROAD TELEPHONE: GLENVILLE 1-1222 CLEVELAND 10, OHIO

America's Largest Stock of Electric Melting Furnaces!

2—Swindell Top Charge 9′ dia. shell Duplexing Furnaces, 1500 KVA transformers with taps for 11,000 or 13,200 volts. New 1944, used very little. Top charge for regular heats or may be charged through trunnion for ladle or cupola metal. Amplidyne controls. May be seen in place near Chicago. (If you want a larger transformer we have 2500 KVA, 11,000 or 13,800 volts.)

1—Whiting Hydro Arc 8 MT Top Charge, 5600# per hour rate of melt, 8900# capacity of well, 8″ electrodes. Furnace new 1952. 2000 KVA transformer, 12,000 volts. Complete with American Air Filter, smoke hood and Whiting Bag Type Dust and Smoke Suppressor. May be seen in place Chicago.

1—Chicago 3000# Electric Furnace, tilt back head. 4″ electrodes, 800 KVA, 12,000 V transformer. Complete. May be seen in place Chicago.

1—Swindell Type 6 ton 9′ diameter Shell Electric Furnace, 2500 KVA transformer, 13,800 or 11,000 V. In our Chicago warehouse.

Lectromelt 1 ton Side Charge with 800 KVA, 12,000 V transformer. Late type unit. Complete. Now in our Chicago warehouse.

Lectromelt 500# Side Charge Type T, 300-375 KVA transformer, 2300 V primary, Moore controls, G. E. circuit breaker. Late type. Now in our Chicago warehouse.

Transformers—2—2500 KVA furnace transformers, 11,000 or 13,800 primary voltage.

1—Detroit Electric, 1500# capacity, 13,200 primary voltage. Kuhlman transformers. Complete with controls.

Detroit Electric 350#, Type LFA with Kuhlman transformers and oil circuit breaker, 13,200 primary voltage.

Detroit Electric with 350# and 1000# tapered shells, 2300 V Kuhlman Transformer. Complete with panelboard and bus bars.

ACME EQUIPMENT CO., INC. 126 South Clinton Street, Chicago 6, Illinois
Phone: ANdover 3-3430

The AAA trademark is your assurance of the *Finest* in Factory REBUILT Equipment. BUY NOW with Complete Confidence. NO RISK INVOLVED. Ask about our NEW SALES POLICY.

AAA MACHINERY & EQUIPMENT CO.

15539 SARANAC ROAD — CLEVELAND 10, OHIO

PHONE: LIBERTY 1-6545

AIR & ELECTRIC HOISTS

4—**INGERSOLL-RAND** Size C, 2000 lbs.
7—**INGERSOLL-RAND** Size D, 4000 lbs.
1—**INGERSOLL-RAND** Size DR, 2000 lbs.
2—**INGERSOLL-RAND** Size E, 10,000 lbs.
2—**INGERSOLL-RAND** Size D-6, 6000 lbs.
1—**CHICAGO-PNEUMATIC** Model A, 1000#.
1—**ELECTRO-LIFT** 3000 lbs capacity, low head room, cable type, 4 Hp motor.
4—**AMERICAN** Engineering Type A1, 2000 lbs cap. 220/3/60 cycle, for tramrail.
1—**DETROIT** 5 ton cap. Model LHR, 440 volt Ser. #19317E 1953 unit.
2—**WRIGHT** electric 6 ton capacity, low head-room. (Never used)

BUCKET ELEVATOR

1—**JEFFREY** 50' centers of drive pulleys, 106' belting 13", with continuous type buckets, Jones Reducer, motor etc.

CUPOLA CHARGER

1—**WHITING** 3 Ton Tiger Monorail, type 2 motor wishbone charger, cab operated, with controls, 5 buckets etc. 80' tram beam track & conductor. Buckets 48" x 52" w/super structure. 1953 unit.

CORE BLOWERS

3—**OSBORN** No.'s 91 & 92, with air clamps.
2—**REDFORD** No. 1, Cartridge Bench Type.
1—**DEMMLER** No. 1 with Air Clamps.
1—**DEMMLER** No. 3K with air clamps, cores to 25 lbs cap. 1953 unit.
1—**CHAMPION** No. CB-400, weight of core to 300 lbs, draw 6½".

CUT-OFF SAWS & MACHINES

1—**TABOR** Type C10AF, cut-off saw, with 10 HP motor, 16" wheel, 38" x 25" table.
2—**TESSEMER** Model H, Sprue Cutter ¾" cap, brass, with 3 HP motor.
2—**CLIMAX** #2A Wire Straighteners, 4 Sizes 1/16" to ¼" with 1 HP V-belt.

CORE OVENS

3—**GEHNRICH** Single compartment recirculating gas fired, with all controls etc. 6' W x 11' L x 7' H walk-in type.

CONVEYORS—ROLLER-APRON-BELT

1000'—**MATHEWS** Gravity Roller, 10" wide 2½" roller dia. 4" centers.
200'—Gravity Roller 16" wide—2¾" diam. 4" centers, above rail.
200'—**MATHEWS** Gravity Roller 18" wide—2¾" diam. 4" centers, above rail.
1—**FARQUHAR** 18" x 35' Model 334-3, portable trough with 5 HP motor and elect.
1—**FARQUHAR** 18" x 19' Model 341 Undercar unloader, rubber belt, 5 HP motor.
1—**LINK-BELT** Steel Apron 18" x 24'.
125'—**LOUDEN** Monorail, complete with four 20' bridges and all accessories.
300'—**STANDARD** Gravity Roller 24" wide, 3½" diam. on 6" centers, 6" channel.
150'—**STANDARD** Gravity Roller 12" wide, 3½" dia. on 4" centers, 6" channel.

CUPOLA & FURNACE BLOWERS

1—**GE** Centrifugal Type FS3670-9400 Serial #27006, w/motor 100 HP, 3600 RPM.
1—**BUFFALO FORGE** No. 7-E, 25 HP-32 oz. 1600 CFM, 28" wheel.
9—Furnace Blowers 1-5-7½ HP-16 oz.

ELECTRIC FURNACES

3—**DETROIT** Type AA, Rocking, 1500 to 2000 lbs cold charge, w/400 KVA transformers 4650 primary volts, single phase.
2—**DETROIT** Type AA, Rocking, 750 to 1000 lbs cold charge, w/250 KVA transformers, 4650 primary volts, single phase.
1—**PITTSBURGH-MOORE** Electro-Melt Furnace Model CQ, 4000 lbs capacity, less transformer & switch gear, 1939 unit.

GAS & OIL FIRED FURNACES

3—**LINDBERG-FISHER** Model MNP, size 2400, gas or oil fired, w/motors-blowers, NEW pots, electrical tilting mechanisms.
5—**LINDBERG-FISHER** #400 Crucible, Type BBI, hand tilting, gas or oil fired, with motors-blowers, 1950 units.
1—**STROMAN** #600, Model U Tilting Reverberatory, gas or oil fired, w/motor-blower, 1949 unit.
2—**STANDARD** #30-#150 Crucible, Stationary gas or oil fired, w/motor-blower.

GRINDING EQUIPMENT

2—**FOX** No. 5 High Speed Stand Grinders, wheel size 24" x 3" w/10 HP motor.
1—**FOX** No. 7 High Speed Stand Grinder, wheel size 30" x 3", w/15 HP motor.
2—**HAMMOND** WR-1 Double End Snagging 7½ HP—wheel size 20" x 3" x 10".
1—**HAMMOND** WR-1 Double End Snagging 10 HP—wheel size 24" x 3" x 10".
1—**STANDARD** #30 Double End Multi-Speed Model 101—10 HP—wheel 24" x 3".
1—**U. S.** Double End Snag. Model 65, 20 HP-4 speed unit, wheel 24" x 3".
1—**MARSCHKE** Swing Frame, 3 HP-220/440.
3—**MARSCHKE** Swing Frame 15 HP 2 speed unit, wheel size 24" x 3" x 12".
3—**MARSCHKE** Swing Frame 20 HP—3 speed units, wheel size 24" x 3" x 12".
1—**QUEEN CITY** Model 100 Double End Disc, 10 HP motor, wheel 20" x 2" x 2".
1—**U. S.** Electric Swing Frame, 15 HP, 2 speed unit, wheel size 24" x 3" x 12".

LADLES & POURING DEVICES

10—**WHITING** Riveted Crane Ladles, taper side with V-bail (E-Z Pour) enclosed gearings nose pouring, ½-1-2-3-4-5 ton.
6—**MODERN** 1500# Cylindrical Geared, with crane bails & floor stands, NEW covers, 30" dia x 29" length.
3—**MODERN** Mixing Ladles, on trunnions, geared, covered & lined, (2-40" x 60") 1-36" x 36", with preheaters.
6—**INDUSTRIAL**, Lip pour, 24" diam, x 24" H, 1600 lbs cap. Enclosed Timken gear.
12—**WHITING** Models 1000 & 2000 Pouring Device w/500# ladles, hand tilt devices.
6—**MODERN** Models F-FA-FA-9 & F-9 Pouring Devices with 500 Lb. covered ladles, trolley, & hand Tilt devices.

JUST PURCHASED
"MUST MOVE FROM PREMISES"
MOLD CONVEYOR, new 1951. Used less than 2 years, acquisition cost $37,000. 49 cars, 300' track, 36" x 72" car top, complete with roll-off conveyors, motors and drive.

SAND DISTRIBUTION BELT
Various lengths, 18", 20", 24", with motors, drives, sand hoppers and plows, less than 2 years old.

RUBBER BELTING
18", 20" and 24".

MOLD CONVEYOR

1—**PALMER** "B" w/no. HD-12 speed reducer & Reeves variable drive 4-1 ratio, 200' straight track, 7-3' sections 90° curves 1-6' section; 2-1' section 30° curves, car size 18" x 42", 80 cars, 1948.

MOLDING MACHINES

1—**DAVENPORT** #2SSA Jolt Rollover & Pattern Draw 30" x 40" table, 12" draw, 1500 lbs cap.
2—**INTERNATIONAL** RES Jolt Squeeze Rollover Draw Size 15" x 8" draw, flask cap. 24" x 42" O.D.
1—**INTERNATIONAL** PKL Jolt Squeeze Air Pin Lift 18" x 24" table, 5½" draw.
2—**INTERNATIONAL** G Jolt Rollover Foot Draw 18" x 56" table, 8" draw, (other 20" x 8").
1—**INTERNATIONAL** LP-10 pin lift machine.
1—**MILWAUKEE** #1030 Jolt Pin Lift, 28" x 34" table, 12" draw, 1000 lbs cap.
3—**MILWAUKEE** No. 124-6 Jolt Squeeze, 17" x 26" table, 12" cylinder. Portable.
3—**OSBORN** No. 559 Portable Jolt Strippers 25" x 30" table, 1200 lbs jolt.
2—**OSBORN** No. 601 Jolt Rollover Pattern Draw, 600 lbs cap. overall flask 30".
6—**OSBORN** No. 275 J, Jolt Squeezers.
2—**OSBORN** No. 142 Jolt Rollover Foot Draw 14½" x 24" table, 8" draw, 350#.
1—**OSBORN** No. 710J Jolt Squeeze Pin Lift, 16" x 25" table, 6" draw, 10" squeeze cyl.
1—**OSBORN** No. 712PJ Jolt Squeeze Pin Lift, 18" x 28" table, 6" draw, 12" squeeze cyl.
2—**HERMAN** 40" x 60"—13" Diam. Cyl. Heavy Duty Bumper Plain Jolt Machine.
1—**JOHNSTON & JENNINGS** No. 918-B Jolt Rollover Pattern Draw, 44" x 54" table 18" draw 3000 lbs capacity.
2—**JOHNSTON & JENNINGS** No. 815-B Jolt Rollover Pattern Draw, 30" x 40" table, 15" draw, 1500 lbs cap. air operated head.
1—**TABOR** 22" Shockless Jar, Rollover & Pattern Draw, 22" x 42" table, 10" draw, 600 lbs cap. portable.
2—**TABOR** 30" Shockless Jar Rollover & Pattern Draw, 30" x 40" table, 12" draw, 1000 lbs. cap. Portable or Stationary.
3—**SPO** No. 506 Jolt Rock-Over Pattern Draw Machines, 24" x 25" table, 10" draw, 600 lbs cap Portable or Stationary.
2—**SPO** No. 507 Jolt Rock-Over Pattern Draw 32" x 40" table, variable draw 10" to 20", 1500 lbs cap. 1948 models.
1—**SPO** No. 508 Jolt Rock-Over Pattern Draw Machine, 28" x 30" table, draw 9" cap. 1200 lbs. Jolt cap.
1—**SPO** No. 413-D Jolt Squeeze Power Rock-Over Pattern Draw 24" x 25" table, 10" draw, 600 lb cap. max. flask 26" x 36".
1—**SPO** No. 213-D Jolt Squeeze Strip Machine table 19" x 28", 8" draw, 800 lbs.
7—**SPO** No. 110J Jolt Squeezers, Portable

SAND MULLERS

1—**BEARDSLEY & PIPER** No. 60 Speed Muller, Model G, 10 cubic ft. batch size, with 50 HP motor and all electrical.
1—**BEARDSLEY & PIPER** No. 30 Speed Muller 3 cubic ft. batch size, with motor & electrical, serial No. 30-2.
3—**SIMPSON** #2 style UD, unit drive type, 6' pan diameter, 1500# batch size, with or without skip hoist loader, aerator and all electrical, etc.
1—**SIMPSON** No. 1 H, style K, Unit Drive type, 4' pan diam, 500 lbs batch, 2 muller wheels, w/5 HP Master unit drive.
1—**SIMPSON** No. 1½ style UD, unit drive type, 4' 6" pan diam. 700 lbs batch size, with 7½ HP Master Unit Drive, skip hoist.
5—**SIMPSON** No. 3, Style C, Separate Drive 8' pan diam. 3000 lbs batch, 40 HP motor & Falk Reducers, serial No.'s in 58,000's, 1946 units. Gear enclosed.
1—**BAKER PERKINS** #5A continuous muller, 100 to 120 tons per hour.
1—**MIX MULLER** #3½ core sand mixer, portable w/1½ HP motor.

SAND BLASTING EQUIPMENT

1—**AMERICAN WHEELABRATOR** 27" x 36" Tumblast w/skip hoist, shot return electrical etc. Ser. #A63757.
1—**AMERICAN WHEELABRATOR** 66" Diameter Swing Tables, w/shot return.
1—**PANGBORN** No. GK-2 Roto-Blast Barrel w/bucket loader etc. 7 cubic feet cap., drum size 30" x 38", airless type, 1943.
2—**PANGBORN** EP-5 Shot Blast Cabinet 5' x 4' x 7' shot return, pressure tank.
1—**PANGBORN** Shot Blast Room, 10' x 10' x 12' walk-in type, with pressure tank, nozzles, hoses, elevator etc.
1—**PANGBORN** Roto-Blast Table 6' Diam. with 6-20" tables, Model LG.
1—**BESSER** Paddle mixer, 36" x 42" horizontal drum, 12 cu. ft. cap. w/7½ HP motor and v-belt drive.

SAND PREPARATORS

8—**BEARDSLEY & PIPER** Models "S"-"M"-"L" Screenerators, portable units.
1—**BEARDSLEY & PIPER** #70 Portable Sand Preparators with magnetic separator, 90 cu. ft. hopper, gyrating screen, aerator, 1946 unit, ser. #SC-73.
1—**AMERICAN** Sand Cutter Model AM, size 69/45—serial #176—motors enclosed.
1—**AMERICAN** Sand Cutter Model BD, size 75/60—serial #722—motors enclosed.
1—**ROYER** Model NC-4 Portable Sand Conditioner, 12 to 15 tons per hour cap.
2—**ROYER** Model C-2 Portable Sand Conditioners, 25 to 30 tons per hour cap.

SHAKEOUTS

1—**ROYER** Shakeout & Sand Conditioning Unit, Serial No. ST-47.
1—**SIMPLICITY** 4' x 6' Model B Serial No. 46-SOB-145, 5000 lbs cap.
1—**SIMPLICITY** 2' x 3' Gyrating Sand Screen—single deck—Model CA—Motorized.
1—**SIMPLICITY** 4' x 10' model D with automatic crusher, 15,000 lbs. capacity.
1—**STONEY** core knockout machine.

SAND SLINGERS

1—**B & P** Tractor Type 13' w/magnetic 4" liner & cups, 19" head, w/spare head 22"-5" liner & cups—25 HP.
1—**B & P** Tractor Type 13' w/magnetic tower, 16" head, 4' ramming, 4" tip, 1946.

TUMBLING BARRELS

5—**SLY** 36" x 60" with 5 HP Gearhead motor & drive—built-in magnetic brake.
2—**SLY** 42" x 72" Square 10 HP Gearhead motor & drive—built-in magnetic brake.
2—**SLY** 24" x 36" w/motor and drive.
1—**SLY** 42" x 66", Type C, 10 HP gearhead motor drive—built-in magnetic brake.
1—**NEW HAVEN** Air Blast Barrel 42" x 48" with motor & drive etc. 1942 unit.
1—**MCLEOD** Type "S" sand blast barrel, 30" x 30", motorized.

SELLING OUT

One of America's Largest
Production Foundries

750 tons DAILY CAPACITY

Everything must be sold and removed to clear the premises.

5—AIR COMPRESSORS—Chicago Pneumatic Synchronous motor 3600 CFM, 2200 CFM and 1200 CFM. Ingersoll-Rand 800 and 600 CFM.

100—AIR TOOLS—all kinds.

200—BLOWERS and FANS—all sizes and types mancoolers, and vent fans up to 5-100 HP, 24 oz. cupola blowers, Spencer, Roots, Ingersoll-Rand and General Electric.

CHARGING SYSTEM—Atlas tape printing scale, buckets, Monorail Cleveland charger 400′ rail.

50—BRIDGE CRANES—mostly Cleveland 6′ to 20′ spans, some electrified.

43—CORE BLOWERS—Redford bench type, International SB 13 and 17's Osborn 93—193—193A Automatics.

10—CORE CONVEYORS flat belt 24′ to 95′ long, 32″ high complete with drives.

37—CORE DRAW MACHINES—SPO CD 36 or Ferro.

17—CORE GRINDERS—Milwaukee 70″ or Stoney 12″ to 18″ wheels, 60″ travel.

11—CORE OVENS—all combination oil or gas
- 4 Coleman 45′ Vertical Towers
- 1 Coleman 36′ Vertical Tower
- 2 Coleman Vertical Horizontal ovens
- 1 Coleman Vertical Horizontal 30″ x 12′ shelf
- 3 Coleman Double Door Car Type

CORE CONVEYORS—hundreds of feet with Jervis B. Webb 458 chain.

4—CORE PASTE OVENS—Coleman combination oil or gas 24″ x 62″ opening chain conveyor type.

35—COREMAKERS ROLLOVERS—most all sizes Osborn or International.

COOLING TOWER—casting cooling tower with hundreds of feet of 658 Jervis B. Webb chain.

4—CUPOLAS—Whiting #9's with controls.

10,000 ft. CONVEYORS—roller conveyor 8″ to 24″ heavy duty.

ELECTRIC MELTING FURNACE
Electromelt type R side charge
800 KVA 11000 volt transformer

FLASK RETURN—Conveyors.

50—GRINDERS—Snag Double End, swing frame, Gardner 179 flat disc.

200—HOISTS—Cleveland and Yale Electric, Ingersoll-Rand and Curtis Air and Peerless chain hoists.

HOT METAL DELIVERY SYSTEM
Cost over $60,000 in 1950. Electric driven monorail carriers and Cleveland track.

50—LADLES—Geared crane ladles 22″ x 22″.

LOCOMOTIVE CRANE—American 25 ton diesel 55′ boom, New 1951.

3—55″ MAGNETS

4—MOLDING CONVEYORS—car type, 300′—452′—490′ and 491′.

MOLDING MACHINES—all jolt squeeze pin lifts
- 12 Osborn 712 PJH
- 2 Osborn 724PJ
- 6 Osborn 726
- 2 Osborn 726 PJA with Hydra motors
- 11 International PK 20
- 7 International PKL 12-5

MULLERS—B & P 30's—40's and 60's with bucket loaders, Simpson #2—Link Belt pug mill type.

ROLLOVER CONVEYORS—10,000 ft extra heavy to light duty 8″ to 24″ widths.

SAND HANDLING EQUIPMENT—belt conveyors 18″ to 24″ flat belt and trough—bucket elevators—coke elevators and hoppers, aerators, pug mills, molders hoppers.

ROTOCLONES—most all sizes 8—16—24—27 wet and dry types.

SAND SLINGERS—B & P Stationary.

SCRAP YARD CRANES—5 and 10 ton DC Shepard Niles 68′ span—runway 249′ long, needs only a skin to make it a complete building.

2—SHOT BLAST—continuous type Pangborn handles cylinder heads, motor blocks or similar items.

WHEELABRATOR—American 48 x 48 with skip.

THIS IS ONLY A FRACTION OF THE ITEMS WE HAVE FOR SALE

WRITE **WIRE** **PHONE**

FERRO MACHINE AND FOUNDRY COMPANY

3155 EAST 66TH STREET • DIAMOND 1-7170 • CLEVELAND, OHIO

MONEY SAVING VALUE • NEW MACHINE PERFORMANCE • IMMEDIATE DELIVERY

BACKED BY UNIVERSAL'S GUARANTEE OF SATISFACTION OR FULL PRICE REFUND

AIR COMPRESSORS
1—40 HP SULLIVAN, Model B-Bim #8, WL 60 w/Receiver.
1—25 HP INGERSOLL-RAND, slow speed, horiz. ER-1, 9 x 18.

BLOWERS
1—85 HP G.E. Cupola Blower, 24 oz.
1—40 HP SPENCER, 3600 CFM, 24 oz.
3—7½ HP FISHER, 16 oz.
3—5 HP NORTH AMERICAN, 16 oz.
15—CENTRIFUGAL BLOWERS, 350 CFM to 10,500 CFM.

CLEANING EQUIPMENT
1—SLY BLAST ROOM, 8' x 10' x 7½' w/Dust Collector.
1—AMERICAN #1 MULTITABLE, 6 aux. tables 15", main table 45".
1—PANGBORN ROTOBLAST, Airless, #14 Barrel, 48" x 36".
1—AMERICAN TABLAST, #4
1—AMERICAN TUMBLAST, 36" x 42" (New 1951)
1—AMERICAN WHEELABRATOR, 42" x 48" TUMBLAST w/skip charger.
2—SIMPLICITY SHAKEOUTS, 4' x 8'.
1—LINK BELT SHAKEOUT, 5' x 8', 5 HP Motor.
2—TUMBLING BARRELS, Cast Iron, 36" x 24" w/2 HP Motor.
2—TUMBLING BARRELS, Square, 34" x 48".
2—TUMBLING BARRELS, Side Tilt, 18" wide x 20" deep.

CONVEYORS
1—HEWITT-ROBINS, Shaker Type, vibrating, 100' long.
1—JEFFREY, 28' long, 20" belt, troughing idlers.
1—LINK-BELT, 50' long, 19" rubber belt, w/drive.
1—APRON FEED, 10'7" centers, w/drive.
1—STEEL PLATE MOLD, 90' centers, 30" belt, w/drive.
2—STEEL PLATE MOLD, 90' centers, 24" belt, w/drive.
6—SAND BELT CONVEYORS, 10' centers to 140' centers, 18" to 36" belt, complete w/drives and hoppers.
FOUNDRY TYPE ROLLER CONVEYOR—ALL SIZES—SEND REQUIREMENTS

CUPOLAS
1—WHITING, #4, with skip charger, motor and blower.
1—WHITING, #6, With SKIP CHARGER, motor and blower.
2—WHITING, #8, EXCELLENT CONDITION, COMPLETE.
1—MODERN, #3, 46' shell, w/blower.
1—PAXSON, #20, 15 HP Motor, Wilbraham Green Blower.
1—SKIP CHARGER, 3 bottom drop buckets, blower, motor, and scale for #9 Cupola.

CORE BLOWERS
1—CB-400 CHAMPION. 1—3K DEMMLER.
2—#2 REDFORDS. 1—#1 DEMMLER.
2—#1 RANDALL. 1—#92 OSBORN.

DUST COLLECTING
1—CYCLONE Dust Collector, 10' dia. x 22" outlet.
1—SLY, 83" wide x 43" deep x 113" high, 4' hopper, 13" inlet, bag type.

FLASKS & CORE PLATES
400 TONS, CAST STEEL, STRUCTURAL STEEL and STERLING TYPE FLOOR FLASKS—ALL SIZES.

20 TONS, FLAT STEEL and PERFORATED STEEL CORE PLATES.
SEND FOR COMPLETE LISTINGS

FURNACES—DIRECT ARC MELTING
1—150#/hr. "LECTROMELT".
1—250#/hr. Hydraulic Top Charge.
1—500#/hr. "LECTROMELT".
1—1,000#/hr. LECTROMELT.
1—1,000# SWINDELL
1—2 Ton WHITING top charge
1—6 Ton HEROULT.
Several 3 Ton to 10 Ton capacity Side and Top Charge Furnaces.

FURNACES—DETROIT "ROCKING"
2—200# cap. DETROIT, complete.
3—350# cap. DETROIT, complete.
1—1000# cap. DETROIT, complete.
1—3000# cap. DETROIT, less Transformer.

FURNACES—INDUCTION MELTING
1—20 KW AJAX Spark Gap High Frequency, 17 lb. capacity in steel.
2—60 KW, AJAX-TAMA-WYATT, Alum.
3—333 KW, AJAX-TAMA-WYATT, 1500# Alum.

We wish to extend to our many friends in the Foundry Industry our sincere best wishes for a Happy and Prosperous New Year.

FURNACES—OIL AND GAS
1—HAUSFELD Tilting #675, 250 cruc. Oil fired.
1—STROMAN Tilting, 125 cruc., Oil fired.
1—FISHER 4 Burner MNP, 1700#, gas fired.
3—WALKER YORK #400 cruc. tilting, coke fired.
2—HAUSFELD Tilting, 1200# Mag. Oil Fired.
3—MONARCH Oil Fired Stat., #60 cruc.
5—FISHER 400# Tilting, Oil fired.
1—SKLENAR, 2000#, Oil Fired.

LADLES & POURING DEVICES
2—6 TON TEAPOT, Worm Geared.
1—10 TON WHITING, Lip and Bottom Pour, EZ mechanism, used once.
4—10 TON BOTTOM POUR, 55" x 55".
2—15 TON BOTTOM POUR, 65" x 59".
2—45 TON TREADWELL, Excellent Condition.

MOLDING MACHINES
5—MILWAUKEE Jolt Pin Lift 32 x 38" table.
1—J & J #612 Port. Rollover.
3—INTERNATIONAL "G", 24 x 10" Jolt Rollovers.
5—OSBORN Jolt Rollovers, Hand Draw, #142.
3—OSBORN 710J Jolt Squeeze Strippers, 16 x 25" table.
3—TABOR Jolt Squeeze in Head.
1—OSBORN #243 Jolt Rollover.
1—OSBORN #559 Jolt Stripper, 25 x 30" table.
1—DAVENPORT #28A Jolt Rollover.
3—HERMAN Rollover & Jar, 6000#, 60 x 80".
10—SPO #110 J Jolt Squeezers.
11—DAVENPORT #30-T Jolt Strippers.
2—OSBORN #405 Jolt Rollovers.
2—TABOR POWER ROLLOVERS, 30 x 40" table, 20" cyl., 12" draw.
2—TABOR POWER ROLLOVERS, #2242 w/clamps, late.
1—TABOR Jolt Stripper, 20 x 20" table, 4" draw.
1—SPO, 9336, Jolt Clamp rollover draw.

MULLERS AND MIXERS
1—SIMPSON #0, NEVER USED.
1—SIMPSON #1, Unit Drive, Late Type.
1—SIMPSON # 2, Unit Drive
2—SIMPSON #3, Complete w/SKIP HOISTS.
1—CLEARFIELD #404.
2—CLEARFIELD #610 and #920.
1—BEARDSLEY & PIPER #60 SPEEDMULLER, 60 HP motor, SKIP LOADER.
1—LINK-BELT REVIVIFIER, Size 5.

OVENS
2—FOUNDRY EQUIPMENT, 2 compartment, 5' wide x 6' high x 10' deep, Oil Fired, Recirculating, Walk-in.
1—FOUNDRY EQUIPMENT, Oil Fired, 4 drawers.
1—CRAWFORD, Gas Fired, 3 drawers.
1—HOTPOINT EDISON, ELECTRIC, 6 drawers, 30" x 40" x 8".
1—CORE OVEN, 82" high x 6' deep x 12' wide, 2 sets of drawers, gas or oil.
1—YOUNG BROS. 3 compartment, kiln type baking oven, electrically heated, with CONTROLS.
1—MAHON ANNEALING OVEN, GAS FIRED, 9' x 18' x 6½', 1600 degrees F., controls recirculating.
1—DESPATCH TOWER, Gas Fired, 27 racks, 11' x 12' x 40'6" high.

SAND CUTTERS
6—AMERICAN SAND CUTTERS—
1—MODEL "AA", 60" reel, Gas Driven.
1—MODEL "K", 72" reel, Gas Driven.
1—MODEL "F", 80" reel, Gas Driven.
1—MODEL "D", 76 x 96".
1—48" Cutting Reel.
1—SANDMASTER, 70/102, New in 1950, Rubber Tires.

SAND LABORATORY EQUIPMENT
1—TEST CORE BAKING OVEN #606.
1—MOISTURE TELLER #278T.

SAND PREPARATORS
1—REDDY SANDY UNIT.
2—JEFFREY SANDITIONERS, Portable.
5—SCREENERATORS, Size "S" and "M".
3—ROYER SAND BLENDERS, 16" belt, 12" belt, 8" belt.
2—B & P SAND CONDITIONERS, portable.
1—LOWE GYRATORY RIDDLE.
1—HETHRINGTON & BERNER SAND DRYER, rotary, oil fired, #552.
1—CLAM SHELL BUCKET

SAND SLINGERS
1—BEARDSLEY & PIPER MOTIVE JR. 19" head.
1—BEARDSLEY & PIPER TRACTOR TYPE 16" head, magnetic separator.
2—PORTABLE SLINGERS, 16" head, 4' long, on Trucks.

TESTING MACHINES
1—TINIUS OLSEN, UNIVERSAL, 100,000# capacity.
1—TINIUS OLSEN, BRINNEL HARDNESS, 3,000 KG.
1—RIEHLE, UNIVERSAL, 2 screw mechanical, 100,000# capacity.
1—RIEHLE, BRINNEL HARDNESS, hydraulic, 3,000 KG.
1—ROCKWELL, HARDNESS, #5JR with "C" Brail.
1—BALDWIN - TATE - EMERY, UNIVERSAL, Hydraulic tensile, 24,000#.

TRUCKS
3—CLARK, FORK LIFT, 108" lift, Gas driven, low price.
1—HOUGH PAYLOADER, 1000# capacity, EXCELLENT condition.
2—BELL PRIME MOVERS, 1000# capacity, Gas driven.

UNIVERSAL MACHINERY AND EQUIPMENT CO.

TELEPHONE READING 7-1321

320 East Broad Street
Shillington, Reading, Pa.

FOR SALE

AIR COMPRESSORS

Ingersoll Rand Type 10—14 x 9 x 12, 2 stage, 75 HP, 3/60/220/1200 rpm synchronous motor, 350 CFM at 100#.

5 x 5 Ingersoll Rand 10 HP motor.

Ingersoll Rand Type 10, 800 CFM, XRB2, 16" stroke 20" x 12½" cylinder, 2 stage compressor, 206 HP, 220 volt motor, with starter and air receiver. Complete. This unit was rebuilt in 1952 by Earl Knox Co.

Ingersoll Rand Type 10, 800 CFM, 2 stage air compressor, 200 HP, 220 V motor. This is an older unit. No starter or air receiver. Overhauled in 1951.

Sullivan Vertical Single Stage 100 HP air compressor, 220 volt motor, with starter and air receiver.

BLOWERS

Spencer Turbo Blower, 2250 CFM at 16 oz. 15 HP 3/60/220 totally enclosed motor. New 1947.

Ingersoll Rand Motor Blower Type FS. Single Stage 4000 CFM @ 3.75 PSI, 100 HP, 220 V. G.E. Induction Motor.

Buffalo 7E Direct Connected Blower, 50 HP Westinghouse motor, 3/60/220-440 V, 3535 rpm, 28" wheel. 3500-4000 CFM at 32 oz. Flanged outlet.

General Electric 7500 CFM, 20 oz., 89.6 Max HP, 220 V motor. Airway controls.

CONVERTER

100 KW Rotary Westinghouse 220 V 60 cycle primary 250 V DC, complete with controller and panel.

CORE BLOWERS

International SB 13.
Federal Sandblo CB40B, like new.
Demmler #50.
Peterson Core Blower (Similar to Demmler #50).

CRANE LADLES, GEARED

1—42" x 47" Crane Ladle.
2—44" x 44" Crane Ladles.

CRANES

5 Ton P & H Overhead Elec. Traveling Crane 30'6" span, 15' lift (can be increased) 3 motor, 220 V A.C. New 1946.

CRUSHERS—PULVERIZERS

1—Stedman 15" x 12" Type A. With 10 HP 220-440 V motor.

DUST COLLECTORS

Whiting Dust Suppressor, bag type, 12,000 CFM, 30 HP motor to handle hot fumes from electric furnace hood. New 1953. Cost us over $14,000 before erection and without wiring or duct work.

GRINDERS, DISC

Besley 208 Double End 26" x 2⅜" wheel with 2 compound tables, V belt drive, 15 HP, 220-440 totally enclosed motor, magnetic starter controls.

2—U. S. Model 80 Double End 2-18" dia. wheels, 7½ HP motor, 2 swinging tables 8" x 14"—1 with hand lever feed.

GRINDERS, SNAGGING

McCabe 2" x 24" wheels, 48" between wheels, 3/60/440 V.

1—Hammond type 20 WR2—3" x 24" wheel, double end grinder, single speed, 20 HP Louis Allis Squirrel Cage, 220-440 V—1760 rpm motor.

1—U. S. DE, Model 65, 3" x 24" wheels, variable speed, 20 HP motor.

Hisey Wolf adjustable speed 15 HP 30" x 3" wheels, 220/440 V motor.

Kling Bros. 30" Double End Snag Grinder, heavy duty, 15 HP motor.

Kling Bros. 18" Double End Snag Grinder, heavy duty.

GRINDERS, SWING

2—Fox 10 HP 3/60/220-440 V, Swing Frame.
U. S. 15 HP, 3/60/440 V Swing Frame, 2 speed.
Fox 15 HP Swing Frame, 2 speed.
Marschke 20 HP, 2 speed.

HOISTS

1000# Cleveland 220/440 V.
1000# Detroit 220/440 V.
5—1000# P & H Hevi Duty with trolley.
2—2000# P & H Hevi Duty with trolley.
11—4000# P & H Hevi Duty with trolley.
2—4000# P & H Hevi Duty with trolley and powered drive unit for moving hot metal.

LADLES

1 Ton Enclosed Gear Crane Ladle truck type 4 wheel car for 18" gage track, Whiting Junior.

MOLDING MACHINES

2—Champion Pin Pushoffs, 38" x 40"—12" draw.
1—Johnston & Jennings 1015 Jolt Pin Lift, 30" x 38" table.
1—Champion Hand ram, hand clamp, hand rollover 26" x 14" table.
1—Champion Hand Ram, Hand rollover, Hand draw core machines, 15 x 15 bed.
3—Davenport Portable Jolt Rollover Pattern Draw 20" x 24" tables, open end, 8" draw.
1—International Type G 24 x 10 Jolt Rollover, foot draw, 22" x 30" table, 10" draw.
1—Herman Molding Machine Jolt Rollover Pattern Draw, 20 x 30.
1—Herman Molding Machine Jolt Rollover Pattern Draw, 20 x 36.
1—International Type G 30 x 12 Jolt Rollover Foot Draw, 28" x 36" table, 12" draw.
1—International Type G 30" x 30" table, 9" draw, Portable.
2—International Type G 18" x 56" table, 8" draw, Portable.
1—International Type F Jolt Rollover 27 x 12, 12" draw, 35" x 26" table.
1—International Jolt Rollover Pattern 10" Draw, 22" x 30" plate, 6" jolt cylinder.
1—International Plain Jolt Molding Machine 48" x 60" table, no pit required.
1—Herman Jolt Rollover Pattern draw, 40" x 84" table, slotted nickel alloy table over regular table to accommodate various sized flasks, air clamp, new 1946. Used very little.
1—Herman 20" x 30" rollover pattern draw, 750# series. Air clamp.
2—Herman 20" x 24" Jolt Rollover Pattern Draw, 750# series. Air clamp.
1—Herman 4000# Series High Speed Rollover 30" x 60" with 32" x 48" bumper, 13" cylinder pattern device.
2—Milwaukee Arm Type Jolt Squeeze Strippers, 1500# capacity, Model 163-50 Serial 13104-5, 15" x 24" table, 16" x open end, pattern size. Late type.
1—Osborn 76J Portable Jolt Squeeze Molding Machine 12" cylinder.
2—Osborn 405 Jolt Rollover 40" x 70", 2000# capacity, 20" x 60" jolt table and 4 wheel receiving car.
1—Tabor 1000# Rollover, 30" x 60" table.
4—Spo 214 Jolt Squeeze Pin Lifts.
Herman 6000# capacity Jolt Rollover Draw, 50" x 74" table. New 1948.
Milwaukee 2542 Jolt Pin Lift used as companion to the above Davenport. 38" x 42" table. Serial 14805.

MULLERS AND MIXERS

Simpsin #2 Motor on base.
Simpson #3 Motor on base.
Simpson #3 Type H open gear type.
Simpson #3 Open Gear Type. $1000.00.
Simpson #3 Muller with bucket loader.
American Model M Sand Cutter, 70" blades.
Royer NDP 47 14" Belt, 4 rubber tires.
B & P #60 with skip loader.
B & P Speedmuller 80 w/cooling blower.

PREPARATOR

B & P #70 Preparator. Only used 3 months.

RIDDLES

Champion Sand Riddle, floor type.
Universal Sand Riddle.

ROTOBLAST

Pangborn, table with 3-8" rotating work tables, 3 position loading, cleaning and touch-up designed for work similar in size to aircraft cylinders. Like New condition.

SAND HANDLING EQUIPMENT

Blaw Knox Sand Grab Bucket for crane use.

SHAKEOUTS

2—4' x 6' Simplicity.
1—4' x 6' Simplicity, 15,000# capacity.

SPEED REDUCERS

We have a large stock of speed reducers and geared head motors. Write us your needs.

TUMBLING BARRELS

2—Sly 42" x 48" dia. barrels, master geared head motor drives.

WHEELABRATORS

1—American Wheelabrator 48" x 48" with loader, 220/440 V motors.
1—American Wheelabrator 36" x 42" with loader, 220/440 V motors.

WIRE STRAIGHTENERS

2—Climax 1 HP motor.

FLASKS

Hines Popoff and Jackets
1st Figure is Depth of Cope
2nd Depth of Drag

1—10" x 17" flask 4/3
1—10" x 18" flask 5/4
1—11" x 16" flask 5/4 1/2
1—11" x 22" flask 5/4
1—12" x 12" flask 5/3 1/2
1—12" x 16" flask 5/7
2—12" x 16" flasks 6/5
1—12" x 16" flask 7/5
1—12" x 16" flask 7/7
1—12" x 16" Extra 4½" drag
13—12" x 16" C.I. Jackets
1—12" x 18" flask 5/4
2—12" x 18" flasks 6/6
1—12" x 18" flask 7/7
1—12" x 18" extra drag 5"
1—12" x 18" extra drag 7"
11—12" x 18" C.I. Jackets
1—12" x 20" flask 5/5
1—12" x 20" flask 5/7
2—12" x 20" flasks 7/5
1—12" x 20" extra 5" drag
8—12" x 20" C.I. Jackets
2—12" x 22" flasks 5/5
8—12" x 22" C.I. Jackets
1—12" x 26" flask 5/5
11—12" x 26" C.I. Jackets
1—12" x 30" flask 5/5
11—12" x 30" C.I. Jackets
1—14" x 28" flask 6/6
1—15" x 18" flask 5/3 1/2
1—16" x 21" flask 6/5
1—17" x 17" flask 6/5
1—18" x 26" flask 5/5
8—18" x 26" C.I. Jackets
1—19" x 19" flask 5/4
2—20" x 20" flasks 6/6
7—20" x 20" C.I. Jackets
2—24" x 24" flask 8/8
1—24" x 24" 3" drag upset
1—24" x 24" extra 6" cope upset
8—24" x 24" C.I. Jackets
1—24" x 28" flask 6/6 1/2
2—34" x 34" flasks
10—34" x 34" C.I. Jackets

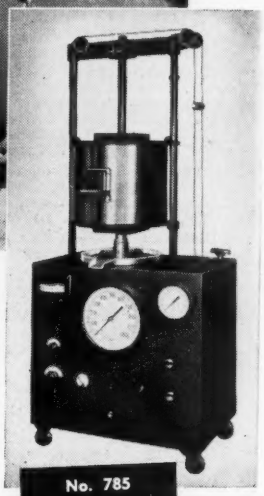
ACME EQUIPMENT CO., INC.

WE WILL BUY FOR CASH A SINGLE PIECE OF EQUIPMENT OR YOUR ENTIRE FOUNDRY

126 South Clinton Street Phone: Andover 3-3430 Chicago 6, Illinois

GOOD CASTINGS FROM THERMOLAB TESTED SAND

Beloit Iron Works, Beloit, Wis., make these 12 ton Dryer Shells without loss. The Sand is tested daily in the Thermolab.



No. 785 THERMOLAB

Here is a good way to be sure your important castings will come out of the sand in perfect condition.

The above 5 foot Dryer Shell appears just as it came from the shakeout, clean and free from defects.

Beloit Iron Works consider the Thermolab an essential part of their quality control program. Savings in casting finishing operations alone, paid for the Thermolab in the first six months.

High temperature sand testing and control in the Dietert Thermolabs is the key to high casting quality.

HARRY W. Dietert COMPANY

CONTROL EQUIPMENT
SAND · MOLD · MOISTURE
CARBON · SULFUR

9330 ROSELAWN AVE. • DETROIT 4, MICHIGAN

The Dietert Co. will be glad to explain how a Thermolab can help you.

Write TODAY TO DEPT. A FOR DETAILS

GLOSSARY OF FOUNDRY TERMS

Compiled by Ed Bremer, FOUNDRY Metallurgical Editor

This extensive glossary of foundry terms was compiled from a wide variety of sources. Arranged in handy booklet form, it is a valuable reference for every foundryman. *48 pages.*

$1.00

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COST CONTROL Westover ENGINEERS

FOUNDRY MANAGEMENT CONSULTANTS
3110 WEST FOND DU LAC AVE., MILWAUKEE 10, WIS.
There is no better time than NOW to review incentives, methods, scheduling, production control and paperwork processes.

SHORT CUT TO PROFITS

ohio MAGNETS

WELDED AND BOLTED TYPES • ALL SIZES • COMPLETE CONTROL EQUIPMENT • 28 YEARS A LEADER IN MAGNETIC MATERIALS HANDLING.

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Associate Member Institute of Scrap Iron and Steel, Inc. A-9095

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DEBARDELEBEN COAL CORPORATION
2201 First Ave., North • Birmingham 3, Ala.
Phone 3-9135

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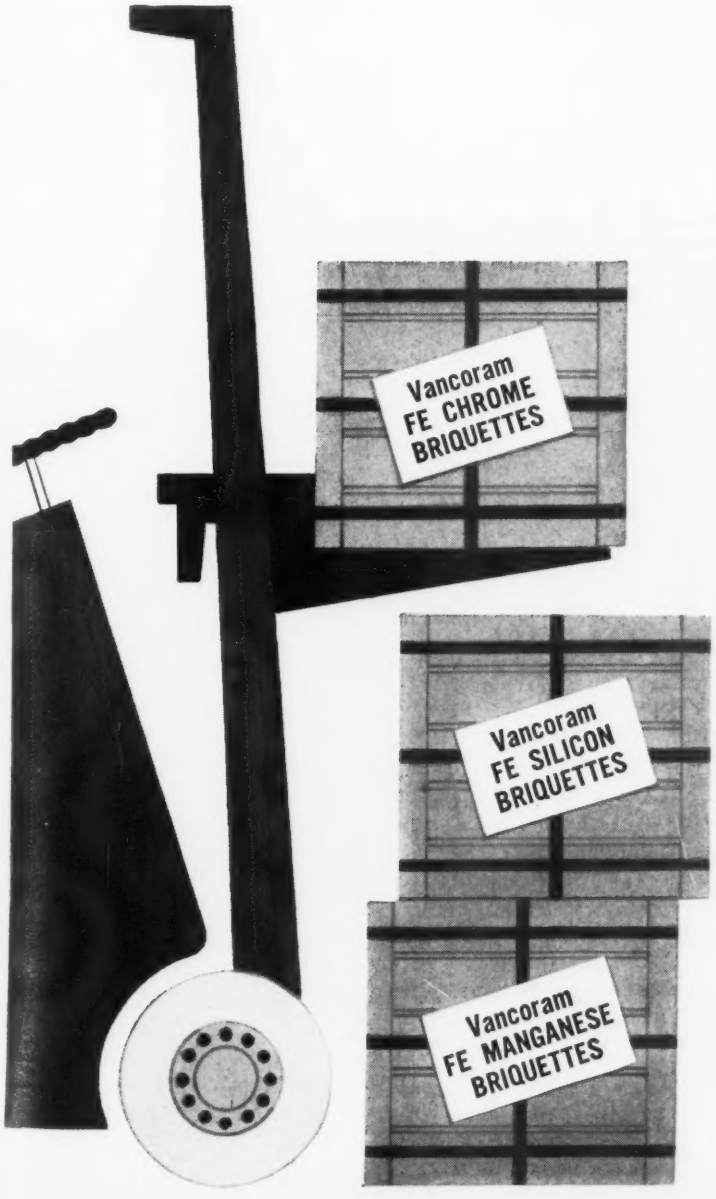

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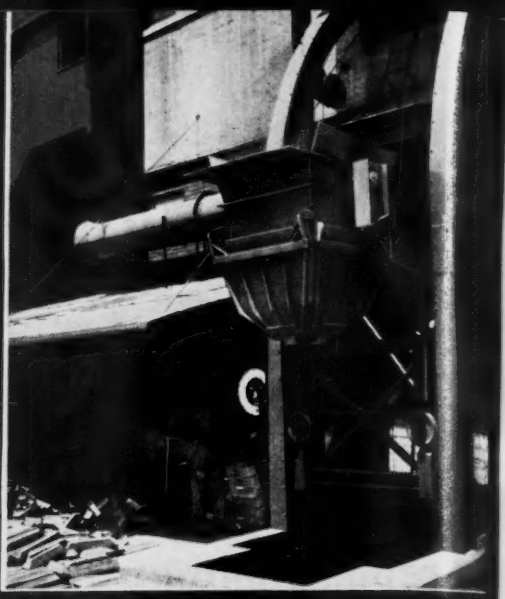

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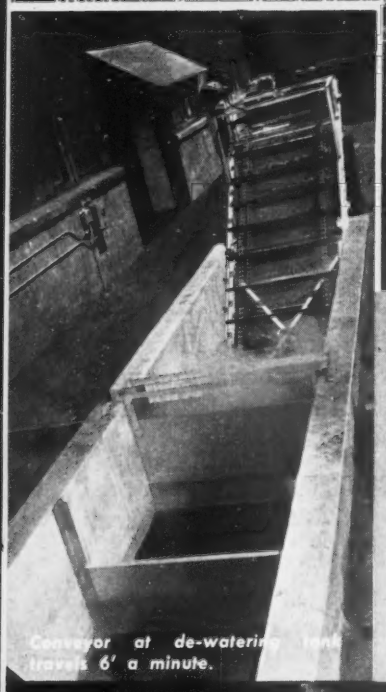

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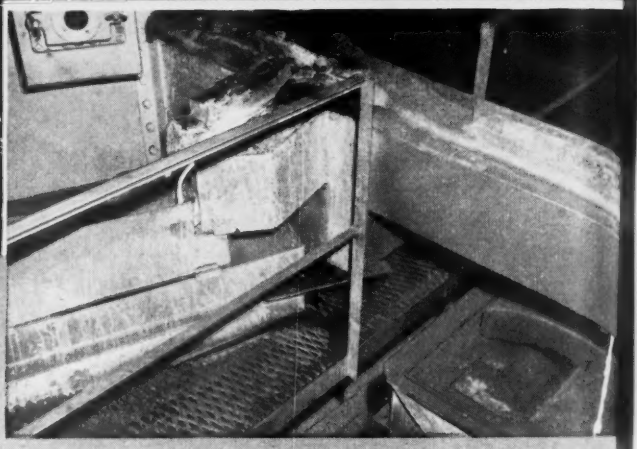

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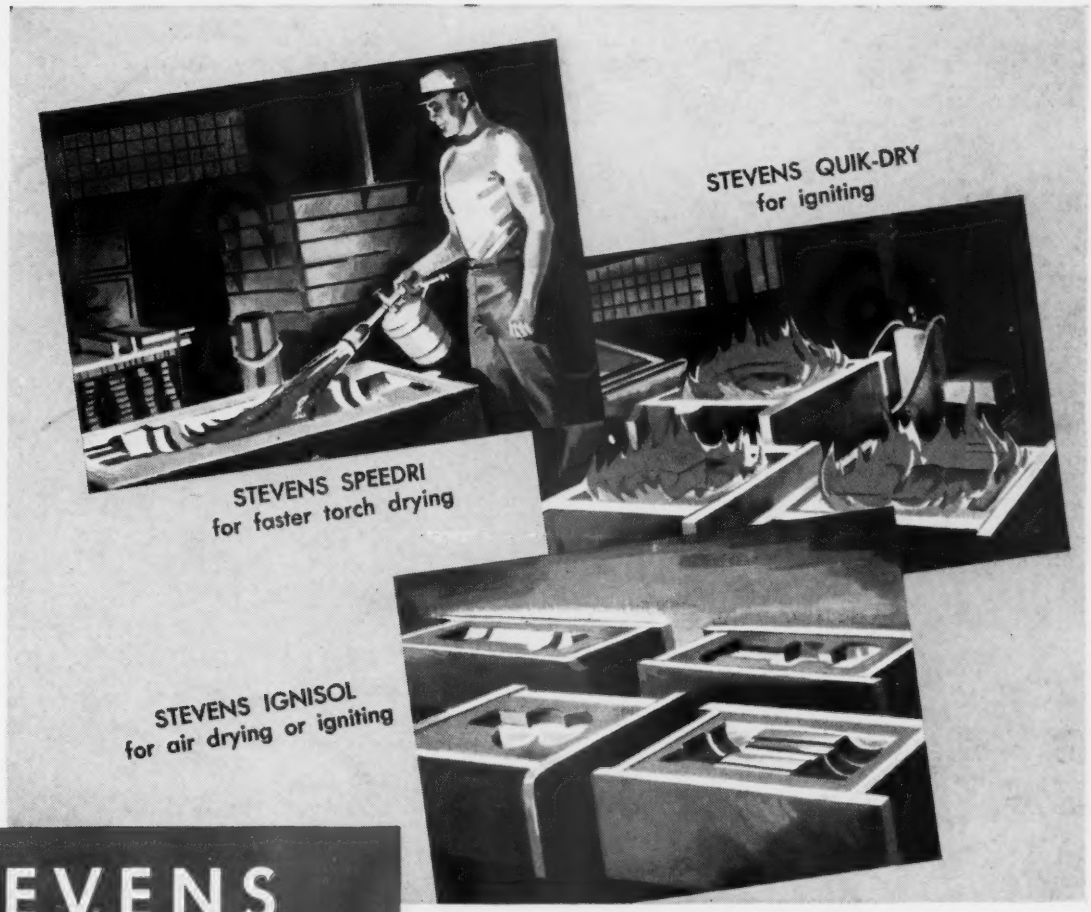

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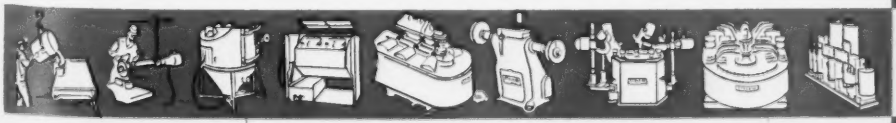

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